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IRON AGE

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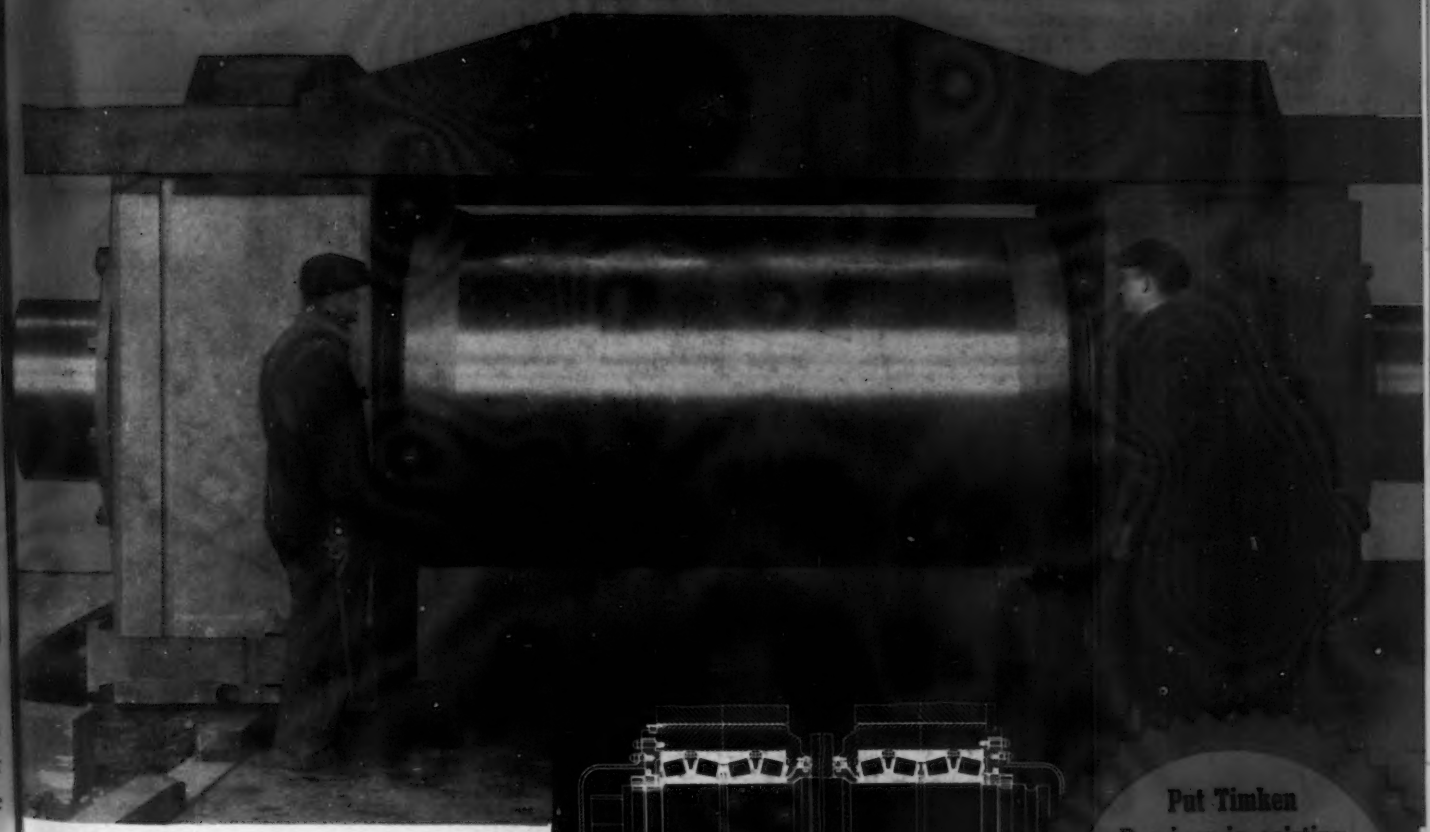

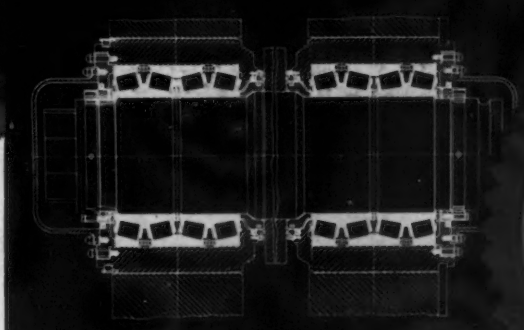

Typical Timken 4-row back-up roll neck bearing mounting similar to the mounting used in the roll assembly shown above.

Back-up roll assembly for a 96″ plate mill with Timken Roll Neck Bearings mounted in chocks at both ends ready for installation in the housing. Self-contained, simple, compact; makes roll changing easy; no complicated or delicate parts to handle; positive lubrication; chocks effectively sealed against leakage of lubricant or entrance of foreign matter.

Timken Roll Neck Bearings in mountings similar to this have rolled the highest tonnages ever rolled by any roller bearings used on mill roll necks —*upwards of eight million tons*—at the lowest bearing cost per ton rolled ever recorded. The Timken Roller Bearing Company, Canton, Ohio.

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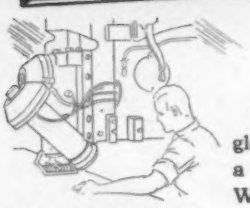
TAPERED ROLLER BEARINGS

How this Lap, Joggled on a QUICKWORK, SAVES 30 TONS OF STEEL

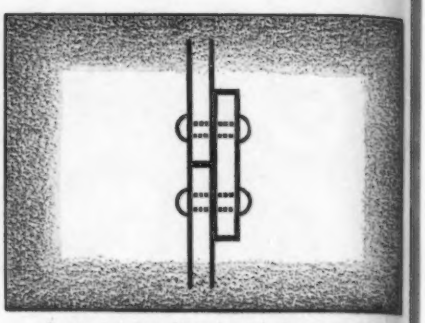


By use of a joggled lap formed on a Quickwork-Whiting Rotary Shear—instead of the conventional type butted joint—30 TONS OF STEEL are saved, fabricating time reduced in constructing a single 10,000 ton ship.

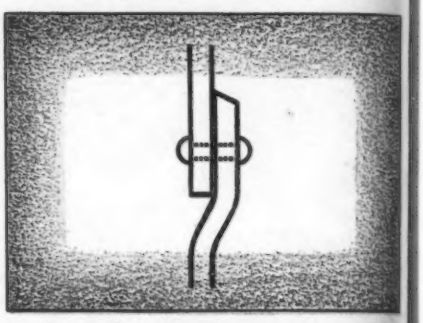
Many parts are being cut out faster today by Quickwork-Whiting Rotary Shears; they cut light or heavy steel plate—shear it cold—to accurate sizes.

With standard attachments, these shears are also used to produce circles, form flanges, joggle for riveting, or bevel for welding—all at amazing speed.

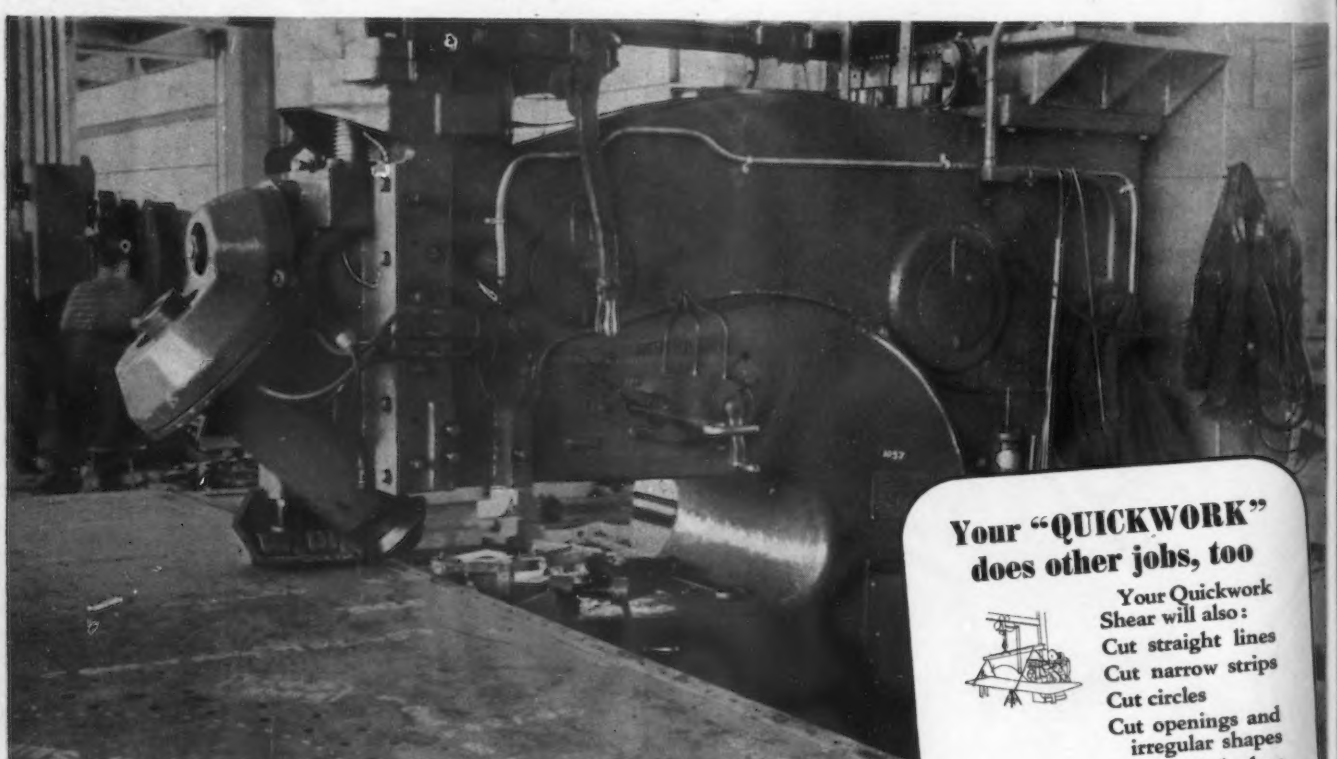
Quickwork-Whiting Shears make possible a great saving of manpower, time, and machines for builders of ships and airplanes and other metal fabricators.



Butted joint fitted with butt strap.



Joggled lap showing savings in metal made possible by use of the joggling attachment on the Quickwork Rotary Shear.



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Cut circles
Cut openings and irregular shapes
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This Week in The IRON AGE

Vol. 152, No. 2 — July 8, 1943

Editorial

Saboteur Bombs 50 Liberty Ships 55

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Technical Articles

Douglas Drop Hammer Technique 58
Predicting Spring Performance of Beryllium Copper Wire and Strip 62
War Finishes Dominate Electroplaters' Convention 68
High Temperature Spraying of Paints 73
The Annealing of Steel 74
Synthetic Rubber Coated Gaskets 77
Resistance Welding of Tool Steel 78
New Equipment 79

o o o

Features

News Front 57
Assembly Line 84
Washington 88
West Coast 92
Fatigue Cracks 96
Dear Editor 98

o o o

News and Markets

Drive for More Steel Opened 103
Coke Oven Makers Urge Changes 107
Prices and Manpower Are Foundry Problems 108
Pressed Steel Gets Prominence 109
Transportation Breakdown Held Imminent 110
List of Seized Patent Applications 115
Personals and Obituaries 156
Machine Tool News 158
Non-Ferrous Metals News and Developments 160
Non-Ferrous Metals Prices; Scrap Prices 161
Iron and Steel Scrap News and Prices 162
Comparison of Prices by Year 164
Finished Iron and Steel Prices 165
NE Steel and Warehouse Prices 166
Stainless Steel, Tool Steel Prices 167
Semi-Finished Iron and Steel Prices 167
Pig Iron Prices 170
Ore and Coke Prices 171
Ferroalloy Prices 172

o o o

Index to Advertisers 237

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Saboteur Bombs 50 Liberty Ships

SUPPOSE you were to read this headline in your daily paper. Wouldn't it make you mad?

If the exceptionally alert FBI could put the finger on the man responsible for such a disastrous and subversive act, how long would it take any court, civil or military, to try, condemn and execute the dastardly culprit?

The German saboteurs who landed on the shores of this country some months ago did not do a thousandth part of this damage. Yet they got what they deserved, namely the firing squad.

There is an old saying that has come down the corridors of time to the effect that "a rose by any other name would smell as sweet." Conversely, I think you will agree that a saboteur, no matter what his name, would smell equally sour to a patriotic American citizen. If he should happen to be labelled an American citizen, he would smell doubly sour.

Right here, I want to quote from "This Industrial Week" in The Iron Age of July 1:

"One hundred and seventy thousand tons of steel lost irrevocably when a nation is fighting for its life equals a genuine setback. That's what the coal mine strikes have cost so far this year, conservatively estimated, and it isn't the final answer."

One hundred and seventy thousand tons of steel lost to us at this time through the scheming machinations of an outcast labor politician is the equivalent of 50 Liberty ships. Ships that never will be launched. Ships that might, in our hour of need and decision on second fronts, bring to bear the difference between success and failure.

How can Americans who believe in their country and love it, Americans who hate Hitlerism and Tojoism and detest their Fascist philosophies, sleep with an easy conscience when they know that there is a saboteur in our midst who has bombed 50 Liberty ships out of existence?

The men who come over here from our enemy countries to do what damage they can to us are not traitors to America. They are merely misguided and fanatical patriots of their homelands. They face death to do what they think will serve their mother countries. As patriots and brave men we respect them; as public enemies and saboteurs we shoot them.

There should be neither respect nor consideration for the renegades who claim American citizenship and who, in the freedom accorded them by this high privilege, do far more damage than any foreign enemy agent.

Perhaps what we need most in this country now is a new conception of sabotage. A conception that will define sabotage by the act performed and not by the title or citizenship of the man performing it. And then after having this definition, next we need the God given guts to exercise an equal degree of justice and punishment.

Machine Output UP 37% TO 110% with INLAND LEDLOY

LEDLOY is the lead-bearing, faster-machining steel that produces more parts per hour, lowers labor and machine costs, and increases tool life up to 300%.

Inland Ledloy is open hearth steel containing a small percentage of lead added by a special Inland process. This addition of lead results in slight refinement of grain structure and greatly increased machinability. In all other physical properties—yield strength, ultimate strength, elongation, reduction of area, etc.—Inland Ledloy is the same as open hearth steel of similar analysis.

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Write for further information on Inland Ledloy

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No. 1—Bottom Bracket Cycle Spindle

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Spindle speed	500 r.p.m.	700 r.p.m.
Time per piece	59 sec.	28 sec.
Tool steel	18% tungsten	18% tungsten
Increased production	—	110%

No. 2—Grease Nipple

	Free Cutting Steel	Inland Ledloy
Spindle speed	2,495 r.p.m.	4,140 r.p.m.
Time per piece	20 sec.	13 sec.
Increased production	—	53%
Increased tool life	—	300%

No. 3—Set Screw

	Screw Stock	Inland Ledloy
Spindle speed	490 r.p.m.	693 r.p.m.
Time per piece	95 sec.	69 sec.
Increased production	—	37.6%

No. 4—5/16" x 2" Bolt

	Screw Stock	Inland Ledloy
Spindle speed, turning	896 r.p.m.	1,126 r.p.m.
Spindle speed, threading	296 r.p.m.	373 r.p.m.
Time per piece	21 sec.	13 sec.
Increased production	—	62%
Increased tool life	—	300%

No. 5—Locknut Blanks

	Free Cutting Steel	Inland Ledloy
Spindle speed	2,140 r.p.m.	2,140 r.p.m.
Time per piece	18 sec.	10 sec.
Increased production	—	44%
Increased tool life	—	50%
Spindle speed, tapping	950 r.p.m.	2,200 r.p.m.
Increased life of tapping tool	—	200%

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The IRON AGE
JULY 8, 1943

NEWS FRONT

• Seven steel construction projects are being given the greenest of lights on equipment in the following order of preference: (1) Carnegie-Illinois at Homestead, (2) Republic at Chicago, (3) Columbia at Geneva, (4) Kaiser at Fontana, (5) Granite City at Granite City, (6) Lukens at Coatesville, (7) Sheffield at Houston, Tex.

• Third and fourth quarters will see bulk of above construction in operation, with aggregate yearly capacity of 3,901,000 tons open hearth ingots, 750,000 tons electric furnace ingots, 2,487,000 tons plates.

• WPB hopes to switch some continuous mills from plates back to sheet-strip by year's end.

• More than 78 per cent of workers in one large German bomber plant are foreigners from 18 different countries.

• A new technique has speeded silver plating greatly; a cast silver anode is used with an agitated solution.

• Water, purified by synthetics, is now being produced equivalent to steam distilled water at a saving of 99 per cent in cost.

• Germany has withdrawn half the coins containing aluminum, suggesting that the aluminum backlog appears none too comfortable after the breaching of the Mohne and Eder dams by the R.A.F.

• Last week's tour of WPB and steel company officials and CIO representatives to Pittsburgh plants was one great welter of good will, a tremendous advancement in management-labor cooperation which will have a decided effect on the future steel output.

• WPB, management and labor dined, some 900 strong, at the William Penn on filet mignon. The 11,000 ration points involved would have wrecked the hotel, so OPA coughed them up.

• Russia's Lend-Lease machine tool allotment, always relatively small, has been cut drastically for the new fiscal year. This is consistent with the super-conservative policy which has given each Russian machine tool transaction months of mysterious delay in WPB's Division of International Supply. Rehabilitation and new plant equipment may be shipped when the Dneiper Valley and Ukraine are retaken.

• Britain has reduced commercial air transport to the lowest depths it has ever reached, and as they say, "a bemused Minister seems incapable of making a plan for rebuilding it". The British are jittery over U.S. expression of intention of dominating post-war air transport.

• Persistent rumors that the Brassert-Cape sponge iron plant for Republic has been halted are without foundation. There has been delay but the plant will be completed this Fall.

• The Wright Brothers are dethroned, German newspapers announced this Spring, shifting the crown to Gustav Weisskopf with the tale of a powered flight in 1901 in a plane he designed and built in America.

• Copperweld Steel Co. will initiate production late this month with its unique cupola-bessemer-electric furnace triplexing plant. The abnormally wet Spring delayed construction somewhat.

• Recent German death announcements show that most Luftwaffe casualties are privates not officers. Airmen famous in 1941 and 1942 now hold administrative posts in the homeland in the Inspektion der Flieger (Inspectorate of Airmen), which many Germans have dubbed Inspektion der Schiever (Inspectorate of Shirkers).

• Current fear of a beryllium-copper shortage because of a lack of ore is based on the assumption that beryllium-copper is a full-blown industry, which it is not. Material going into springs could immediately be doubled if losses through improper control were eliminated. In addition, two of the largest tonnage uses of virgin metal could just as well be satisfied by converted scrap.

• Magnesium alloy sheets are being formed in Germany at a temperature of 599 deg. F. plus or minus 5 deg., the closely controlled heating being carried out by high-frequency equipment.

• Igor Sikorsky says there will be a million helicopters in the U.S. a decade after war's end.

Douglas Drop Hammer

THE aircraft industry owes a great deal to drop hammers. They were the first quantity production machines used in the early '30s that converted painstakingly slow hand methods to a practical and faster production setup. At a time when fairings and fillets were still being formed on a sand bag and fitted to wood concrete blocks with a crowning hammer, the adoption of drop hammers capable of beating out a dozen fairings in a few minutes per piece seemed almost a miraculous advance.

Since that time the aircraft industry has undergone phenomenal expansion, accompanied by many improved production methods necessary to meet production schedules for war contracts. With each new method larger fields were created for better, stronger and more saleable design beyond the wildest dreams of the early pioneers.

Equally radical from a comparative standpoint is the difference between the early drop hammer and a modern air operated drop hammer with the equipment and production methods that go with it. Maintenance on rope type machines was quite complicated and expensive, and accurate adjustment of the head or ram guides just wasn't in the picture. It was a common thing to hang the head on the rope and jiggle it almost ½ in.

With the advent of the Guerin process (hydro press rubber pad forming) and other advanced methods, the drop hammer's reputation for being able to make "anything" became a boomerang. The pendulum of favor swung in the opposite direction and simpler jobs were placed elsewhere. The universal attitude was "if you can't make it anywhere else, send it to the hammers —they can make it." Jobs were considered from the angle of "can you make it?"—not how cheaply or how practical a design could be fabricated. Die making methods were continued without appreciable change. Method improvements were at a relative standstill and in any fast moving industry that means going backwards.

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FIG. 1—This view of the Douglas Long Beach drop hammer shop shows the Kirksite foundry at the left and the first row of Cecostamps at the right. In the foreground is a big 96 x 60 in. machine and next to it a long stroke (87 in.) hammer for high dies, with 66 x 60 in. platen area. Further down the aisle are four 48 x 48 in. Cecostamps and three 30 x 24 in. units for the smallest work.

A Clean Start

Here at Long Beach we considered ourselves very lucky to have been able to plan for a coordinated foundry and drop hammer setup, Figs. 1 and 2, without having to retain old equipment and methods simply because they already existed and had to be utilized. Weak and strong points of

Technique

By PAUL STAYBOLDT
Production Specialist, Douglas Long Beach Plant

. . . With the largest installation of Cecostamps in the aircraft industry, Douglas has worked out drop hammer practices that result in consistently good work at a high rate of output. Sheet metal parts are turned out with as few blows as possible and with a minimum use of rubber pads.

drop hammer operations were analyzed and a clean start made without having to continue a method or a tool simply because "It's good—but we can't change now because of our present dies, our machines, etc."

Therefore a proposed layout was made and approved, hammers ordered and accessory equipment designed and purchased, thus circumventing the usual difficulties and taking full advantage of new equipment.

To our superintendent of fabrication, Jack Hendricks, goes the major credit for fathering the setup and endorsing new and somewhat radical plans and methods. Advantages of advanced equipment and methods are evidenced by the envious record of the stamping department for safety, cleanliness, efficiency and maintenance of scheduled production demands. The purchase or design of every item was analyzed from the standpoint of safety, productive capacity, ease of operation (elimination of the fatigue factor) and simple maintenance. Methods potentially dangerous were eliminated in layout and design to the greatest practical degree. Design of our dies has been considered with equal thoroughness and will be described in later paragraphs.

While it is not the privilege of every plant to start in this manner, the methods and means described have proved themselves and have uncovered other advantages not apparent at the outset of operations. Some of these means can be used by either new or old plants to assist in clearing up hammer shop situations falling below par.

Speaking from hindsight gained after being associated with our new setup, now in operation for two years, and considering other methods used in the same department, such as stretch presses and double-action draw presses (both manually and automatically controlled, mechanically and hydraulically operated), Fig. 2, we feel we can discuss the use of drop hammers quite impartially as a stamping method. Machines chosen were the several sizes of Cecostamps adapted to our uses. Fig. 3 shows the second row.

Use of Cecostamps

All Cecostamps were bedded on concrete inertia blocks suspended from I-beams and coil springs dampened by hydraulic shock absorbers. Value of this feature is total absence of shock transmission to other parts of the plant and less operator fatigue. In addition it has been determined that such suspension deadens noise of impact and has materially lessened maintenance cost. The spring-loaded support columns and wedge adjusted ram ways have proved themselves both efficient and easy to maintain.

The Chambersburg method of controlling Cecostamp operation by means of operator's control lever and safety pedal, is supplemented by the air control valves on the opposite side, Fig. 4. These valves are handled by the helper (with both hands) and must be in simultaneous operation before the hammer will operate. This safety feature is of primary importance. Formerly this was thought to be wasteful of manpower because it required two operators, and slow because it required the coordinated action of two different employees before each stroke could be made. Actually, this control system gives more even distribution of work between operator and helper, cutting elapsed time on the job in the hammer to a much greater degree than anticipated.

Secondly, complete operation cycle of the small Cecostamps corresponding to the 1-ton size drop hammer is as low as 3 sec., compared to 8 sec. for a corresponding rope controlled hammer. In fact, with the accurate stroke and volume adjustments possible, and with an improvement added by Douglas, an operator need only lift his control lever and remove his foot from the safety treadle; the ram will rise quickly, striking the safety head cylinder gently and lowering to the safety catches in considerably less time than you can describe it. Speed and safety are smoothly combined to produce an unusually smooth operation cycle.

If at any part of the stroke the operator or helper decides to release the safety levers or treadle, there is usually enough "head" or volume of cylinder air to raise the ram above the catches or to hold the ram in place until the head of pressure is gone, at which time the ram will slowly come to rest according to the leakage of air past the cylinder rings. This allows sufficient time, usually, to remove any hazard.

We say "usually" because even with the safety precautions built into the machines and rigid enforcement of safety regulations, we never run needless risks. It is emphasized that safety features are an addition to the net safety factor, but are not intended to be used as excuse for unneeded chances or for unapproved methods.

Reinforced Bolster Plates

One feature worth particular mention can be put into any drop hammer regardless of age or condition and has been one of the greatest single contributions to safety and speed. This is the addition of a 3 in. thick bolster plate fastened to the anvil and slotted along the centerline in both directions and diagonally for 1 in. standard T-slot bolts. (See Fig. 4.) We use a

heavy clamp fitting into cored recesses in the sides of the die and held by 6 in. long 1 in. diameter squarehead bolts fitting the T-slots. Failure in holding dies into place has never occurred, and cost and hazard of using molten lead to hold dies in place is completely eliminated. Another important point is removal of the chance of contamination of the Kirksite by lead poured around the die to locate it. After safely using this method for the past two years, we would never return to former methods which have been responsible for so many painful injuries to eyes, hand and feet.

Sheared flanges or beads are quite common on parts made on the conventional rope drop hammer. This is caused by the loose ways and suspension methods which allow an unevenly balanced die to rotate slightly as it comes to rest, whereas a ram rigidly fastened to the piston rod has a stabilizing effect, similar to the crosshead in a steam or diesel engine.

Die Making Practices

Time and motion studies have shown that time savings on these machines are relatively small if operated in the same manner as the older rope-type hammers. It is only when specialized tooling utilizes full advantage of modern equipment that remarkable results are shown. Some practices we observe are listed below:

(1) Kirksite and lead melting and casting operations are kept well separated and good housekeeping is observed to prevent contamination. Several noteworthy procedures have been developed in the foundry, such as alternate use of furnace pots (formerly considered of dubious value). This pays excellent dividends in low dross losses, drastic reduction in pot expense and safe, clean metal that the operators have come to trust, as well as paying dividends in cleaner, sounder castings.

(2) All dies are predetermined as to the direction to be placed in the hammer and are marked on the operator's side with a stamp that also indicates machine hammer size. In the sand mold, it is easy to core holddown depressions and lifting chain pin holes for proper location and balance. This also allows the dies to be placed so that the 1 in. diameter alloy steel holding studs for the lead tops can be placed as needed and identically every time, no matter how many tops are poured. Any potentially dangerous dies or high wall dies can be placed

o o o

RIGHT

FIG. 2—The same bay as shown in Fig. 1, but viewed from the opposite end. Note the related sheet metal form-machinery in the foreground, beginning with the bulldozer at the left, toggle press and stretch forming machine. In the right foreground are the spiders used for accurately positioning the studs for holding the lead tops to the Cecostamp slides. These spiders suspend the studs over the open molds during pouring.

o o o

LEFT

FIG. 3—Second row of air drop hammers. When this picture was taken the 18th Cecostamp had not been installed. These nine machines range in size from 30 x 24 in. to 96 x 60 in. platen area and include a 66 x 60 in. long stroke Cecostamp.

o o o

so that, if failure occurs, broken parts will fly against the hammer side columns instead of to the front or back of the machines and onto the floor—another instance of our extreme respect for elimination of accident-breeding factors.

(3) All inserts for the 1 in. studs used in holding the lead tops are located with a spider adjusted for shrinkage and designed for speed and lightness-using tapered cone centers and tension sleeves for quick adjustment. (See Fig. 2). They do the job accurately in 25 per cent of the time formerly required for a difficult and inaccurate operation.

(4) All jobs for the Cecostamps are predetermined *before* plaster patterns are completed and are passed by tooling men, chosen because they have shown themselves outstanding in the development of dies and in drop hammer operation. All methods are tried and used according to needs of the individual job. The Long Beach plant has no single pet method. Impractical features of design are checked with engineering to eliminate the features causing stamping difficulties.

All new jobs are given "trial tooling run" in which the operator is given a chance to suggest improved die design for better production. This run also gives the tooling division a check on accuracy and size of the part so that the job will then be reasonably ready for production.

Die Design Considerations

The following pointers on die design may be considered primary elements in the Douglas set-up:

All dies must fill the allotted die area *and must be balanced.* This was at first one of the most heartily "cussed" policies but is now regarded as extremely valuable. We will put from one to ten identical pockets or parts into a die—according to size, making use of every square foot of die area.

Fairings and similar parts of compound curvature are usually made in pairs in opposed directions in the same die, thereby completely eliminating the glancing blows that are the cause of loose hammer slides and excessive maintenance, loose dies, sheared and bent ram studs and rubber sheared parts, since rubber pads are almost invariably used for the initial blows. This practice can be put to good use in any hammer shop and will pay dividends. It compares to the principle of die lock in hot forging dies. The old-time hammer men were the hardest to sell on the principle of simultaneously making two opposed parts with rubber pads but now realize how much faster and safer a balanced hit can be.

FIG. 4—Use of supplementary air control valves on the opposite side from the operator's control lever and safety pedal assures that the helper's hands are free of the die area. Note the cross and diagonal T-slots in the reinforced platen, which in this Cecostamp measures 66 x 60 in.

o o o

One of the outstanding advantages of drop hammers is the cheapness and speed of die manufacture as well as full salvage value of die materials (Kirksite and lead). Several emergency needs for parts on the line have been met in 24 to 30 hr. elapsed time—impossible by any other like production method. Full advantage of this is taken. For instance, minor correction to forming aids, such as beads, traps, walls, etc., are often added to the plaster pattern—ready for use the next time the die is cast.

A typical example of such die modification is illustrated as follows: A die on a new part is made from a plaster pattern. The parts take 6 min. each to stamp. It is then found that by squaring the stock and thereby cutting down the trim, changing the die shape by correcting the plaster and recasting the die (at a cost of $35 more), better parts can be made in 1 min. each. The working men and operators next find that by further minor corrections to the plaster pattern and a recast of the die, the part can be made in one or two direct hits without the use of rubber pads. It is now possible to make six parts a minute, at an additional $25 labor cost in tooling.

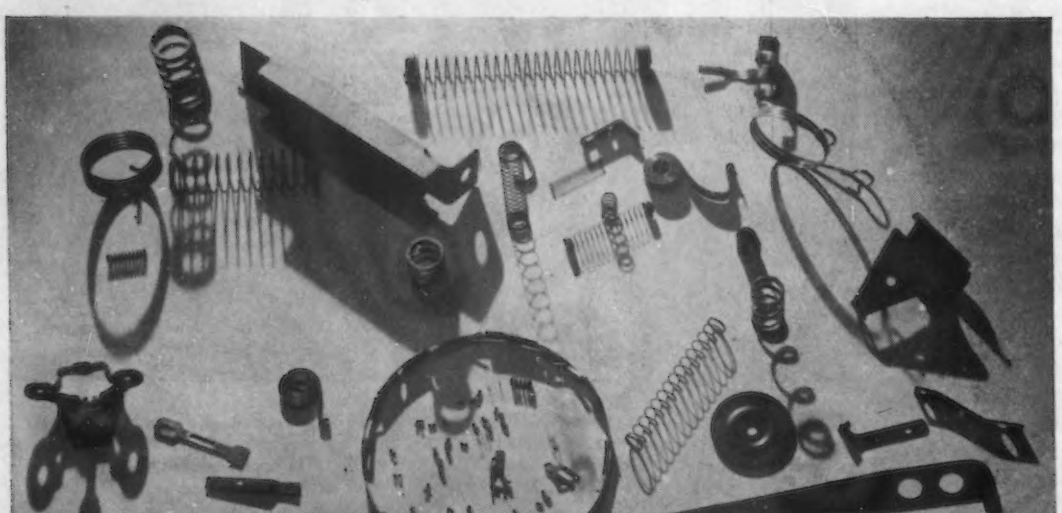
In other words an investment of $75 gave one piece in 6 min. as against a total die investment of $135 giving 36 parts in the same amount of time. This is typical of what is meant by die development. By such procedure, the use of rubber has been reduced to approximately 15 per cent of the amount used by former methods. Utilization of sponge rubber has been virtually eliminated, reflected in better and faster made parts due to the absence of flaking off of worn rubber and blowing out of valuable dies as a consequence.

Because of the favorable cleanliness, safety, and fatigue factors coupled with improved die design, women have been able to take over a great deal of the running of Cecostamps and some are turning in a performance that makes old timers look to their laurels.

We favor parts development on the hammers, and on longer run jobs, conversion to the punch presses or draw presses when indicated. Each production machine has a place in the production picture, and in place of being regarded as in conflict should be regarded as complementary to each other. Let us instead reserve our conflicts to beating the tar out of the axis and help after the war to "stamp" America into the world's best place to live.

Predicting Spring Performance

Of Beryllium Copper



GROUP of beryllium-copper "micro-processed" springs made from wire or strip. Note that some springs are very small whereas others are relatively quite large. Wire diameters range from 0.006 to 0.064 in. and strip thickness ranges from 0.003 to 0.050 in.

TO gain the advantages that beryllium copper offers in spring applications, the material must be (a) of suitable quality and (b) properly heat treated. Every coil of wire and every lot of strip has a particular precipitation hardening time-temperature requirement depending upon its past history and the future of its use. Many of the more critical uses of beryllium copper are only possible if the very best quality of material is used and precipitation hardened at the precise temperature and time to develop the specific properties required for the application. Some springs require maximum hardness or strength, others minimum drift or maximum stability, high conductivity or controlled ductility. The emphasis varies with each design and thus affects the heat treatment required. Because of variations in the quality of the material, some lots may be satisfactory for all these requirements, other lots will be satisfactory for certain uses, and some unsatisfactory for any use.

One important advantage gained from using beryllium copper is the opportunity to make parts from soft, readily formed material which can be hardened after forming to give superior spring qualities. However, the final spring properties obtained from the heat treated material are increased by cold work. Therefore it should be work hardened the maximum possible amount before forming and yet be successfully formed. Severe cold working while greatly improving the physical properties obtainable by precipitation hardening introduces a loss in the stability of the parts unless hardened at a higher temperature (650 deg. to 700 deg. F.) than usually used and for a shorter time (10 to 15 min.). This necessitates closer control of heat treatment but the superior results are well worth it. In addition, the saving in heat treating time reduces costs and increases the capacity of the heat treating equipment.

Test methods described here are based on the metallurgy of the commercial beryllium copper alloys. These alloys contain 1.90 to 2.20 per cent beryllium with not over 0.5 per cent nickel or cobalt added to control grain growth, not over 0.5 per cent iron, silicon or other impurities, and the balance copper. The portion of the beryllium copper phase diagram involved is shown in Fig. 1, with the two important heat treating ranges indicated. After casting, beryllium copper ingots are usually hot worked in the range of 1100-1400 deg. F. This gives a duplex structure of alpha and beta phase which is homogenized by a solution heat treatment of several hours at 1450 deg. F., followed by a rapid quench in water. The alloy is then cold worked, being annealed rather often since it work hardens rapidly. It is annealed by a short heat treatment at 1450 deg. F. followed by a rapid water quench after each anneal. At this stage the structure consists of supersaturated alpha phase plus some undissolved beta crystals, as shown in Fig. 2 for a typical material of acceptable properties.

Beryllium copper is also processed by a method designated as "homogenized" which, up to the final anneal, results in a fine three-phase mixture of alpha, beta and gamma. This con-

Wire and Strip

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. . . Because so much is expected of beryllium copper springs today, it is important that every spring perform as designed. Because beryllium copper is made of two of the most critical metals, it is also important that every lot be heat-treated for maximum properties. Here is a laboratory routine that not only predetermines spring performance of beryllium copper wire and strip but also shows how to heat treat for peak properties.

dition is obtained by heating the alloy at a temperature under 1050 deg. F. for several hours and air cooling to room temperature. It is then cold worked in this condition giving a structure such as shown in Fig. 3. The "homogenized" structure must be annealed at the solution temperature and quenched before it is rolled or drawn to final temper to make it respond to the hardening heat treatment.

The finished material in the case of strip may be supplied as annealed or cold worked two B&S gage numbers, according to the degree of forming to which it is to be subjected. Four numbers hard material may be desirable for parts requiring high endurance. Wire is usually furnished three numbers hard for coiling springs.

After forming, the part is precipitation hardened in the range indicated in Fig. 1 from 600 deg. to 700 deg. F., the time ranging from an hour or more at the lower temperature to a few minutes at the higher temperature. During this heat treatment the supersaturated alpha phase precipitates its excess beryllium in the form of gamma phase which gives the material its desirable hardness and strength. Fig. 4 shows the microstructure for a typical material having good spring properties.

The physical properties of these various phases which are of the most use in determining the quality of wire are electrical conductivity and tensile strength. For strip it is more convenient to measure hardness instead of tensile strength. The advantages of using these tests are the speed and accuracy with which both the quality and the proper heat treatment can be determined. The conductivity is obtained by measuring the resistance of a convenient length of wire, such as 3 ft., with a Wheatstone bridge equipped with a wire clamp for holding and measuring the length to be used. Resistance is converted to per cent conductivity as follows:

Per cent conductivity =

$$\frac{\text{Conductivity factor} \times 100}{\text{Measured resistance in ohms}}$$

Where,

$$\text{Conductivity factor} = \frac{10.37}{d^2}$$

and L = length of wire in feet

d = diameter of wire in Mils

Tensile strength is measured in conventional manner on a commercial machine; one with a dial reading 0 to 100 and 0 to 500 lb. will take care of wire from 0.010 in. to 0.050 in. diameter, both hardened and unhardened. A small neutral salt bath furnace maintained at the heat treating temperature by automatic temperature controls is required for the hardening operation.

Routine inspection procedure for checking quality of incoming wire is as follows: A sample is taken from each spool or coil and tested for conductivity and tensile strength. Wire cold worked 3 numbers hard should always be within the following limits:

Conductivity = 14.5 to 17.5 per cent

Tensile strength = 125,000 to 140,000 lb. per sq. in.

From each lot received or each group of spools having similar conductivity, at least two of the coils are heat treated at 700 deg. F. for 5, 10 and 20 min. Acceptable material should then show:

Conductivity at peak tensile strength = 24 to 26 per cent

Peak tensile strength = 190,000 to 210,000 lb. per sq. in.

Time to reach peak tensile strength = 5 to 15 min.

If maximum tensile strength is reached at 5 min. or before, repeat the heat treatment on new samples at 660 deg. F. for 5, 10, 20 and 35 min. for this heat treatment, the material should have:

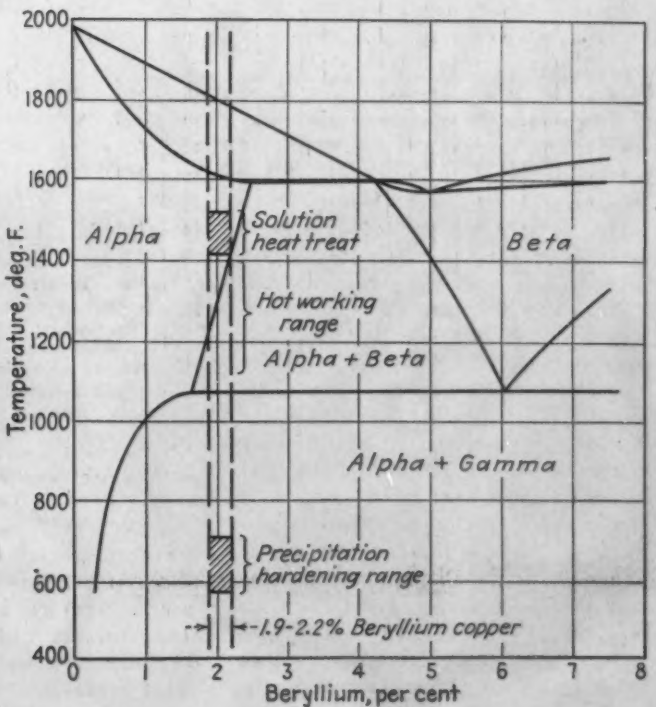

FIG. 1 — Beryllium copper obtains its age hardening properties by a two step heat treatment: A solution anneal in the range of 1400 deg. to 1500 deg. F., followed by a rapid quench, and a hardening heat treatment in the range from 600 deg. to 700 deg. F.

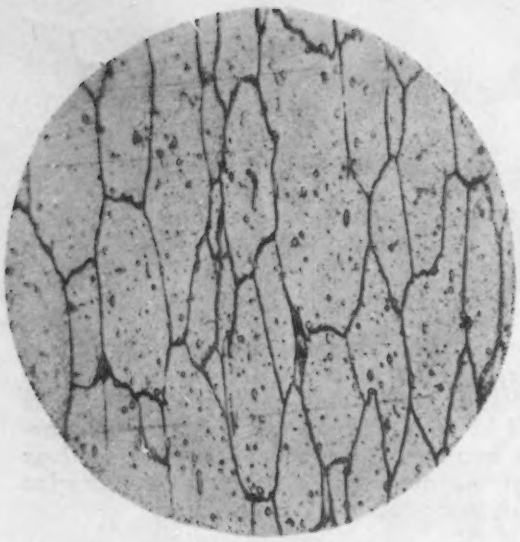

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FIG. 2—Transverse section of cold drawn beryllium copper wire before hardening shows an elongated crystal structure with little grain boundary constituent and small, evenly distributed beta particles. (All microphotographs are at 500 diameters.)

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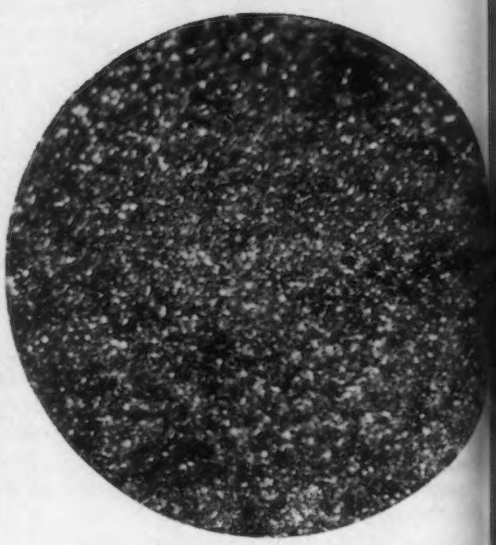
RIGHT

FIG. 3—So-called "Homogenized" structure developed by cold working and annealing at 1050 deg. F. and below. Another anneal at 1450 deg. F. followed by rapid quench is required to obtain age hardening properties.



Conductivity at peak tensile strength = 24 to 26 per cent

Peak tensile strength = 190,000 to 210,000 lb. per sq. in.

Time to reach peak tensile strength = 10 to 25 min.

For convenience the conductivity test is made on a 3-ft. piece of wire and the piece then used for the tensile strength specimens. The values of conductivity and tensile strength obtained for each heat treating time are plotted against time as in Fig. 5, and the point of maximum tensile determined from the curve.

These tests not only establish the suitability of the wire for springs, but can also be used to indicate the probable cause of failure should the material fail to respond properly. Since the conductivity varies inversely with the beryllium content of the alpha phase up to the saturation point, this factor will help to determine the approximate beryllium content. Beyond the saturation percentage, additional beryllium forms beta phase and the drop in conductivity with additional beryllium is less since the beta phase has a higher conductivity than the alpha phase.

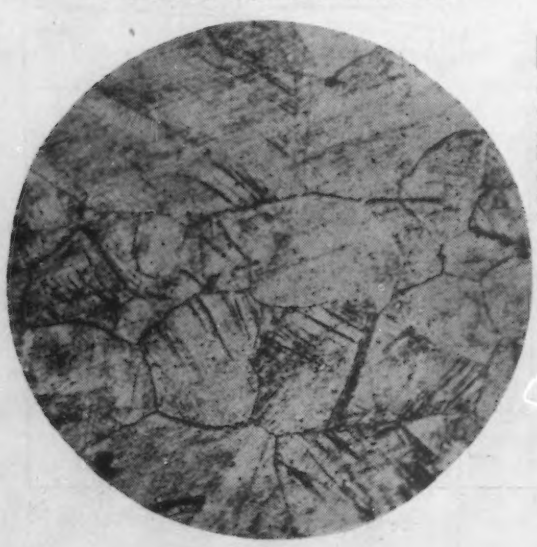
When wire is precipitation hardened, beryllium is precipitated from the alpha phase forming gamma phase. This increases the conductivity about in proportion to the amount of gamma formed giving an indication of the degree of hardening response which then can be confirmed by the change in tensile strength. Since the tensile strength and hardness are dependent not only upon the amount of gamma present but also upon its physical state and distribution this relationship between conductivity and tensile strength varies, and is a useful means of determining the amount of beryllium available for hardening.

These tests also disclose the correct heat treating time and temperature to give maximum tensile strength. When high conductivity is needed, the curve shows to what degree tensile strength must be sacrificed to gain the desired conductivity. The tensile strength curves also serve as a guide in selecting a heat treatment for other properties more difficult to measure when the normal relationship to tensile strength is known. For example, experience has shown that maximum stability or minimum drift usually comes at a heat treating time of 10 to 20 per cent longer than the time for peak tensile strength.

For critical uses this approximate

BELOW

FIG. 4—Typical structure for good material—has no grain boundary precipitate and no large particles of beta phase. The absence of small beta particles might be an indication of low beryllium content if the hardening response were also low.



RIGHT

FIG. 5—Hardening heat treatment in a salt bath at 700 deg. F. has a rapid effect on conductivity, tensile strength and hardness. These curves are typical of good material having little grain boundary constituent and some beta present evenly distributed in small particles.

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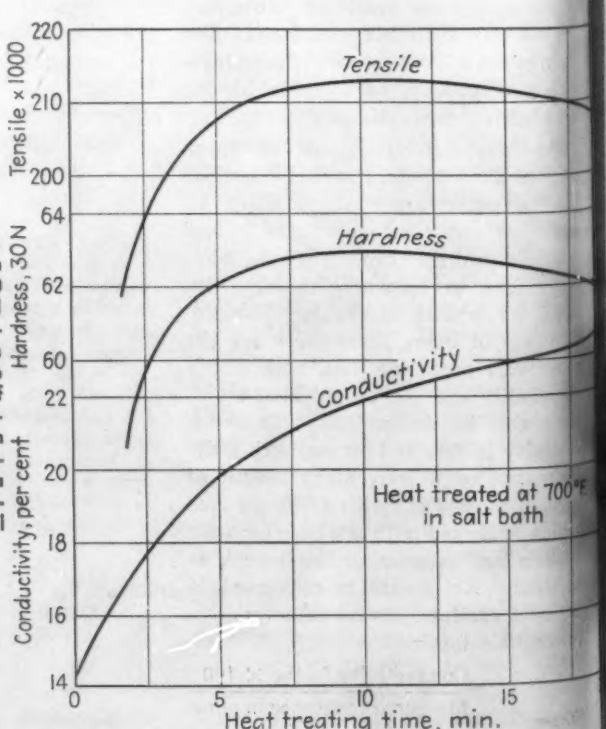

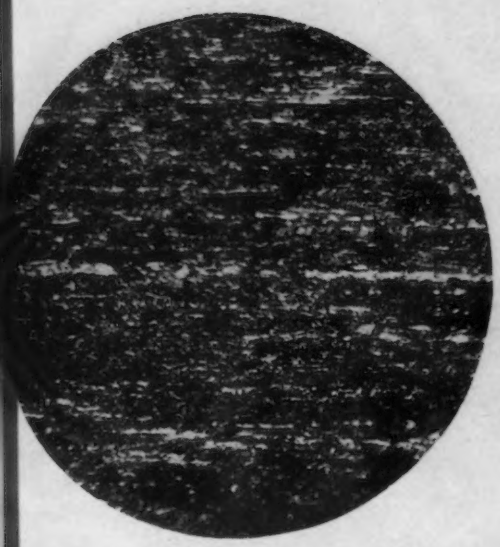

ABOVE

FIG. 7—With the beryllium concentrated in long stringers of beta phase, as in this cold drawn wire, the response to heat-treatment is poor and excessive spring-back and distortion offer serious difficulties in coiling springs.

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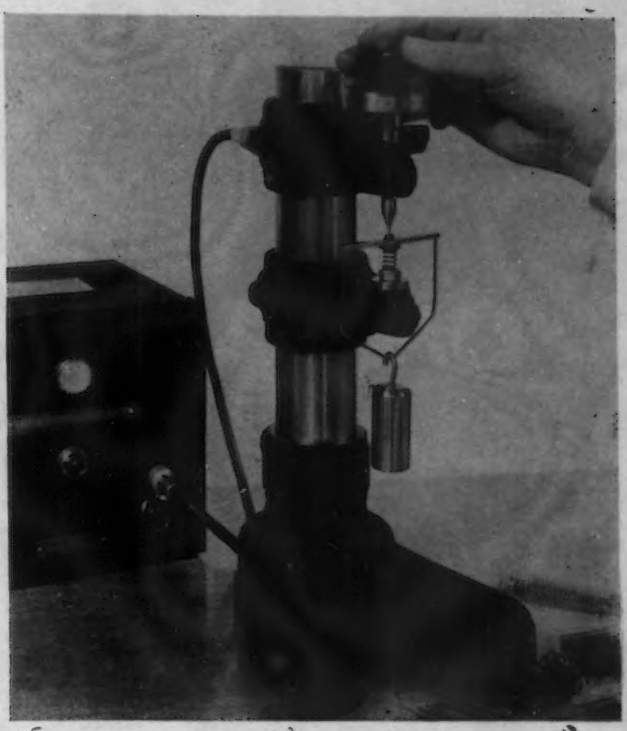

RIGHT

FIG. 6—Electronic Micrometer drift tests measuring the slow decrease in length under a steady load are essential for finding the proper heat treatment giving maximum spring properties.

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method of selecting the heat treating time for maximum stability may not be accurate enough and actual drift measurements then are necessary. Drift is the increase in deflection of a spring under its first load application over a period of time under load. For making such tests quickly, the Electronic Micrometer shown in Fig. 6 measures drift effects as small as 0.00001 in. under load without applying any pressure to the specimen. By determining the drift for several heat treating times a drift curve can be drawn and the heat treating time giving minimum drift selected. When still greater sensitivity is desired, measurements are made on an automatic recording Electronic Micrometer sensitive to 0.000001 in. Although not generally used for routine inspection this instrument is valuable in research and particularly in making comparative tests on various spring materials.

With a little experience conductivity, tensile or hardness and drift tests can be helpful in determining the cause for variations in the quality of beryllium copper. Low beryllium content will result in high conductivity and low tensile strength. The material will be slow to respond to heat treatment with only a small increase in tensile strength and a low increase in conductivity. Under the microscope there will be little or no beta phase present, as in Fig. 4.

High beryllium content will accompany low conductivity and high tensile strength. Response to heat treating will be normal to fast with a normal increase in tensile strength and conductivity, and excess beta will be found under the microscope. Often when the beryllium content is high, the beta will be in the form of elongated strings or stringers, as in Fig. 7 for cold drawn wire. The tensile strength before heat treatment is high, 145,000 to 165,000 lb. per sq. in. Such wire is difficult to coil or form accurately because of excessive and variable springback. These beta stringers are also formed with normal beryllium content as the result of segregation in slow cooling of the cast ingot. It can be differentiated from the first case by a low increase in tensile strength and conductivity during heat treatment. This is because beryllium in the beta form lowers the beryllium content of the alpha phase

LEFT

FIG. 8—With large beta clumps, probably the result of annealing at too low a temperature, there is insufficient beryllium available within the grains to produce satisfactory hardening.

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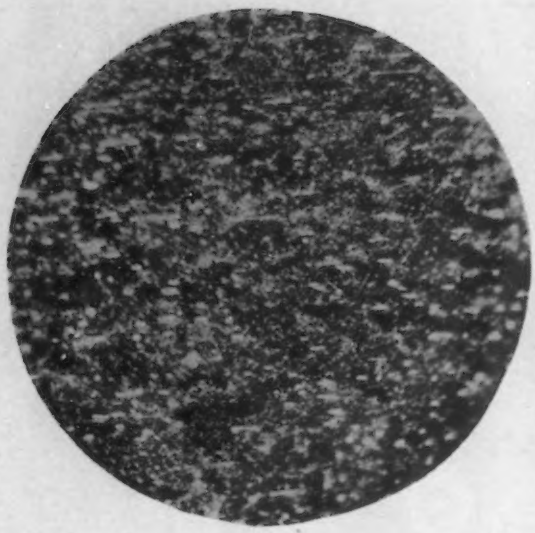
RIGHT

FIG. 9—This type of grain boundary structure, large grain size, and the large isolated clump of beta usually result from over-heating during the solution anneal. Such material will have low conductivity and low tensile strength before hardening.



LEFT

FIG. 10—When wire is strand annealed from too low a temperature and not quenched rapidly enough, the "homogenized" structure of Fig. 3 is obtained which responds little or none to hardening.

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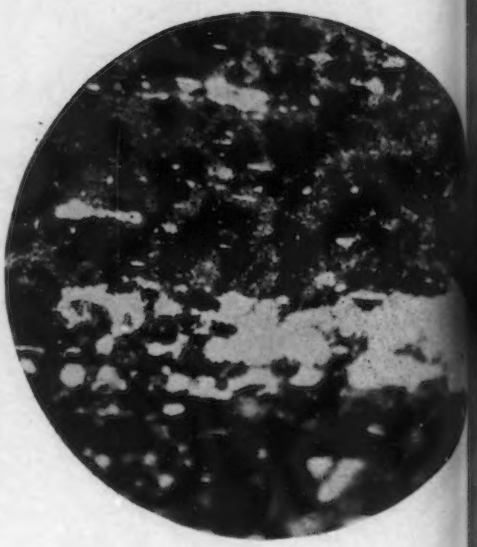


RIGHT

FIG. 11—This specimen of strip combined all the common faults. Beryllium was segregated in stringers and large clumps of meta and the grain boundary constituent was excessive. Hardness before heat-treatment was high causing excessive tool wear. Heat treatment response was low, and severe distortion took place.

leaving less beryllium available for hardening. Also, heat treatment response will be slow since the rate of response depends upon the degree of supersaturation.

Material with high conductivity but normal tensile strength before hardening usually indicates incomplete solution heat treatment due to inadequate time or low temperature during the final anneal in the mill. Upon precipitation hardening such material, the increase in conductivity and tensile strength will be low and the response to heat treatment slow. An excess of beta phase will show under the microscope, often fairly high in amount but fine in size, as in Fig. 8. The alpha grain size will be low, under 0.01 mm.

Too high a temperature in the solution heat treatment will cause low conductivity, and often low tensile strength in the material as received. It is confirmed under the microscope by excessive grain size, 0.050 mm. or over. Areas of incipient fusion may show at grain boundaries, as shown in Fig. 9, and beta will tend to be less than normal.

In the last anneal in the mill it is important that the material be rapidly quenched in water. Slow cooling will show up in various ways. If the failure is due to slowness in getting the wire or strip from the furnace to the quench tank, slow cooling through the alpha and beta zone of the phase diagram (between 1450 deg. and 1100 deg. F.) will show up as high conductivity due to lowered beryllium content in the alpha phase and high tensile strength due to precipitation of beta phase. The structure will then be similar to the "homogenized" material shown in Fig. 3. When given the usual precipitation heat treatment such wire will be slow to respond and the degree of increase in tensile strength and conductivity will be low. Under the microscope an excess beta of a fine size will be present.

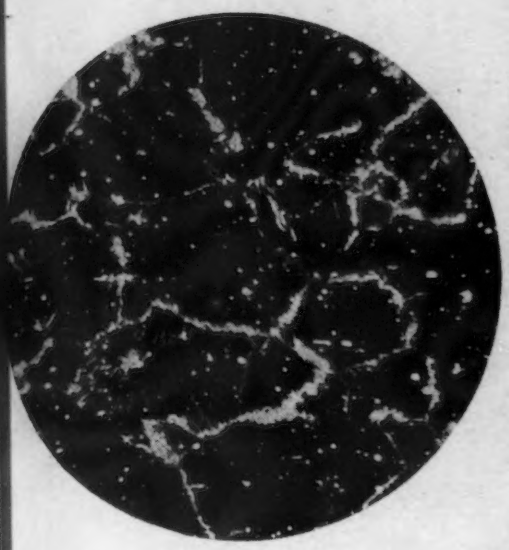
Sometimes the material is quenched fast enough but is removed from the quench too soon or the cooling capacity of the quench tank is such that slow cooling takes place below 1100 deg. F. This is also often true where continuously annealed wire is cooled by hydrogen in the furnace tube. The cooling is rapid enough when the temperature difference is great but slows down as the wire cools off. This results in gamma precipitation taking place rapidly at temperature about 800 deg. F., usually concentrated in the grain boundaries. Both tensile strength and conductivity will be high, and the precipitation hardening heat treatment will cause only a small increase in tensile strength. Often the response to heat treatment is very rapid with a greater than normal increase in conductivity. This may be caused by the larger number of precipitation neuculae forming at the higher temperature but too small in size to affect the hardness and conductivity. When given the regular heat treatment these neuculae grow rapidly and remove more beryllium than usual from the alpha phase, causing the high increase in conductivity. But due to the great number of such neuculae few of them grow large enough to cause appreciable hardening. As shown in Fig. 10, under the microscope the gamma precipitate will be quite evident and characteristic of this material. A similar condition may also result from slow heating of material which does not quite reach the solution temperature.

Wire that is low in tensile strength as received due to lack of work hardening will be normal in its other properties, will respond to heat treatment with a normal increase in tensile strength but will not reach as high a value as desired.

These are the conditions most commonly found in beryllium copper wire commercially available. Interpretation of the conductivity and tensile data, however, is complicated by the fact that these factors affecting quality are not always present singly. But by using the inspection schedule outlined along with microscopic examination the suitability of the wire for any given application usually can be determined.

In the case of strip, conductivity and tensile strength are not so readily measured but the hardness will usually do as well. Samples taken from each lot are precipitation heat treated in the 700 deg. F. neutral salt bath at 5-min. intervals until the peak hardness point is passed by two readings. Separate pieces are not necessary as the hardening effect is additive. A piece may be hardened for 5 min., quenched, the hardness read, and the piece put back into the furnace for an additional 5 min., repeating the process as long as necessary. For thin strip, the hardness is read on a Rockwell superficial hardness tester, the 15N scale being used for thicknesses under 0.020 in., and the 30N scale being used for 0.020 in. or thicker.

Then, hardness is plotted against heat treating time to serve the same purpose as the tensile strength curve in Fig. 5 for wire. The point of peak hardness occurs at essentially the same time as the point of peak tensile strength. The length of time it takes normal material to reach peak hardness will depend upon the degree of cold work. At 700 deg. F. annealed material will take about an hour, while material 2 numbers hard will reach a peak in about 10 min. Devia-



LEFT

FIG. 12—The complex structure in the grain boundaries, which is accompanied by poor hardening response, can be readily revealed by the persulphate etch, which also shows up the white beta phase particles.

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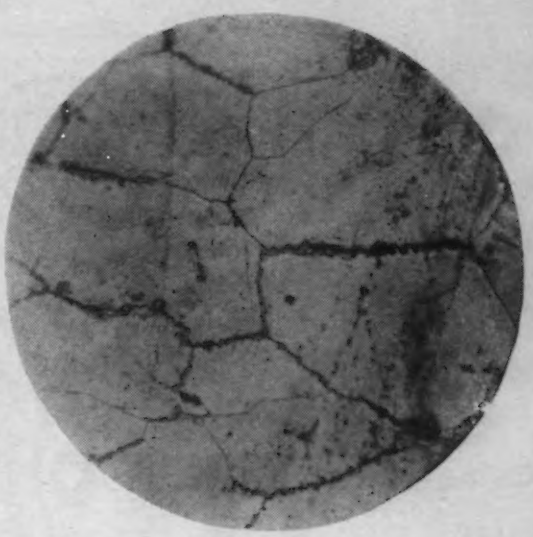
FIG. 13—With the dichromate etch (which does not bring out the beta phase) the grain boundary constituent can be brought up more clearly than in Fig. 12.



tions in the rate of response not accountable for by the degree of cold work, or failure to reach the expected hardness will indicate some deficiency in the material.

Identification of the cause of failure in strip is best accomplished with the aid of the microscope, looking for the same faults outlined previously for examination of wire. In addition, the strip should be examined for evidence of lamination. Material suitable for average spring applications will reach a peak of 30N62 to 65 for 2 numbers hard and about 30N54 to 58 for annealed stock.

As in the case of wire, factors affecting the quality of strip are seldom present singly. The microstructure shown in Fig. 11 is a good example. This material has large stringers and clumps of beta, and an excessive amount of grain boundary constituent. The hardness increase with heat treatment was less than half the normal amount and the springs made from this material distorted severely during hardening. Note that the complex grain boundary precipitate is so heavy in some spots that it covers almost the entire grain area.

Microscopic Examination

Microscope specimens are preferably mounted in bakelite, if small, and polished by any of the methods satisfactory for copper and copper alloys. Polishing with metallographic paper numbers 1, 0, 00 and 000, followed by wet polishing with No. 2 polishing alumina on felt or broad cloth is satisfactory. Etching can be done with several solutions depending upon the object desired. For counting grain size in unhardened material (See Fig. 1) concentrated ammonium hydroxide, water, and 3 per cent hydrogen peroxide in equal parts, used by swabbing or immersion for about 1 min. gives satisfactory results. The beta phase under this etch is rather hard to distinguish but is visible as a somewhat paler blue-gray crystal. Grain boundary precipitate will be visible by the widening of the boundary. Caution is needed with reference to this grain boundary constituent and the specimen should be re-polished and re-etched several times before reaching any conclusion.

For specimens both before and after heat treatment a useful etch is a mixture of ammonium hydroxide and ammonium persulphate, but is of most value for heat treated material. The solution is best freshly prepared as needed by placing approximately 1 gm. of ammonium persulphate in a beaker, adding 10 cc. water and 2 cc. ammonium hydroxide. This etch is applied by swabbing for about 20 to 60 sec. On the unheat-treated piece grain boundaries will be plain for observation of grain boundary constituent and for grain counting, but the beta phase will be hard to detect. For examining the beta phase it is best to give the material a short heat treatment of 5 min. at 700 deg. F. This will not affect the beta phase but will precipitate some of the gamma phase which is darkened by the persulphate etch. The white beta crystals and the complex precipitate at the grain boundaries will then show up plainly against a dark background as in Fig. 12, and can be readily examined.

Heat treated specimens may be examined with the persulphate etch, swabbing the piece for 10 sec. or more until a darkening visible to the eye takes place. A little experience will show the correct degree of darkening for best examination. This etch darkens the gamma phase to a steel blue color which will be somewhat heavier on slip lines and grain boundaries where the gamma precipitation is heavier. Under this etch the distribution of the gamma phase, the beta phase crystals and grain boundary precipitate may be readily observed. If the grain boundaries are not clearly evident the specimen may be given a second etch using 2 gr. potassium dichiomate, 8 cc. concentrated sulphuric acid and 100 cc. water. One drop of hydrochloric acid is added to 25 cc. of this solution just before using. Swabbing the specimen for 1 or 2 sec. with this etch will remove the darkening due to the persulphate etch and bring up the grain boundaries, as in Fig. 13, for observation and grain counting. The beta phase, however, is not readily visible under this etch.

With the laboratory technique as outlined here, many of the difficulties experienced in the past in using beryllium copper can be found before putting the material into use. In addition, the correlation established between these laboratory test results and performance of the alloy in springs will readily disclose at the mill what can be expected from any particular lot of wire or strip. Such tests should make it possible, as a result, to improve the uniformity and quality of beryllium copper wire and strip for spring applications.

Beryllium copper can be the "wonder metal" it was originally claimed to be because occasional lots tested have outstanding properties. When enough is known about the alloy perhaps all lots can be as good as today's occasional best.

War Finishes Dominate

"BLACK Nickel Plating," by W. E. Moline, National Cash Register Co., was introduced with the comment that war production has brought about a greatly increased demand for black nickel plating, and while such plating has been done for a considerable number of years, it is not always possible to produce consistent, uniform black deposits. It is thought that possibly this lack of consistency may have been due to lack of proper understanding of the effect of each of the constituents present in the normal black nickel plating bath. With these things in mind, an experimental program was carried out.

All experimental plating was done on steel panels, 1 in. x 2½ in. These panels were electrocleaned prior to receiving 0.0002 in. copper plate from a cyanide bath, and then after being thoroughly rinsed, were black nickel plated for 30 min., after which all panels were thoroughly rinsed again and dried with compressed air. These coated panels had a smooth, lustrous surface when introduced into the black nickel bath. The type of deposit sought was one which was uniformly black with a luster comparable to that of the initial copper deposit and which could be reproduced consistently. All plating was done in a 2-liter beaker. Anodes were of stainless steel and solution temperature was maintained at 74 deg. F. ± 2 deg.

Optimum solution concentrations and operating conditions were found to be:

	Oz. Per Gal.
Nickel Sulphate ($NiSO_4 \cdot 7H_2O$)	10
Ammonium Sulphate ($(NH_4)_2SO_4$)	5
Zinc Sulphate ($ZnSO_4 \cdot 5H_2O$)	4
Sodium Sulphocyanate (Na CNS)	2
pH	5.6
C.D.	1.5 amp. per sq. ft.
Temp.	70 to 75 deg. F.
Agitation	None

pH is not critical. Good deposits may be obtained with pH values ranging from 5.0 to 6.2 inclusive. pH values below 5.0 tend to produce a dull deposit.

The optimum current density is approximately 1.5 amp. per sq. ft. However, satisfactory deposits may be obtained between 0.75 and 2.25 amp. per sq. ft. Below 0.75 amp. per sq. ft. the deposit is dull and above 2.25 amp. per sq. ft. the deposit appears to be slightly milky.

Low ammonium sulphate concentrations usually result in smutty, dull and non-adherent deposits. There must be at least 4 oz. ammonium sulphate per gallon to produce a satisfactory plate. This appears to be the most critical constituent of the bath.

A low concentration of zinc sulphate produces deposits having a gray metallic appearance; 4 to 5 oz. of zinc sulphate per gallon appears best.

The optimum concentration of sodium sulphocyanate is 2 oz. per gal. Lower concentrations result in extremely dull deposits, and higher concentrations result in a less adherent striated deposit.

Nickel sulphate concentrations have no noticeable effect upon the deposit below 15 oz. per gal. Above this amount, the deposits assume a gray metallic color.

Agitation is apparently detrimental as it usually leads to the formation of a cloudy film on the cathode.

Room temperature appears to be better than slightly elevated temperatures which usually result in a metallic appearance.

Silver Plating Investigated

In a paper on "Rapid Silver Plating" by R. A. Schaefer, head of chemical research and development, and J. B. Mohler, senior chemist, chemical research laboratory, Cleveland Graphite Bronze Co., it was pointed out that the first important work on electrodeposition of silver for use as a bearing metal was done by Mathers and Gilbertson, who studied the adhesion of thick silver deposits on steel. Continuing this work, Crosby and Gilbertson pointed out that the bond between steel and silver is independent of any mechanical interlocking but is dependent on the intra-atomic bond between the crystals of ferrite and silver. Further, the investigations of Simon and Lumley showed that silver could be deposited at current densities as high as 200 amp. per sq. ft. by applying vigorous agitation to the plating bath.

Since the electro-chemical properties of copper and silver are somewhat similar, it was thought that most of the principles associated with the high efficiency copper bath would also apply in the electrodeposition of silver. With this thought in mind the following variables were studied: High metal content, low free cyanide, alkali hydroxide, agitation, temperature, and addition agents.

Assuming the proper preparation of steel shells, a rapid silver plating bath was finally developed as most suitable for use with a cast silver anode and with a special agitation, as given below:

	Gm. Per Liter
Silver cyanide	40-43
Free potassium cyanide	38-42
Potassium hydroxide	8-14
Potassium carbonate	45-80
Temperature	42°-45° C.

This bath gives a dense and ductile deposit on either the inside or outside of cylinders or simple modification of cylinders.

"Studies of the Adherence and Corrosion Resistance of Silver Plate on Steel" by F. C. Mesle, Oneida Ltd., was a continuation of the paper on this topic read at the 1939 Electroplaters' Convention. In the previous paper the author had stated that the use of cathodic current in some alkali cleaners definitely contributed to poor adherence. This poor adherence did not occur when no current was used, other plating conditions remaining the same. To this he added that if anodic current is used in this same alkali cleaner, the tendency toward poor adherence will be corrected.

In the previous paper the author gave a rating of 100 per cent adherence if the plate did not lift when pull enough was applied to break 0.005 in. thickness of silver. Today, standards are higher. If the plate can be lifted from the base, no matter how much pressure is applied, the adherence is not 100 per cent.

Previously it was stated that heating at 350 deg. F. for 10 min. improved the bond strength of a poorly adherent deposit. Today we are asked to heat to temperatures of 1000 deg. F. for 1 hr. or longer as one of several

Electroplaters' Convention

. . . In this, the second part of the report of the American Electroplaters' Convention in Buffalo last month, black nickel plating, silver plating, purifying of electroplating waters, and chroming of engine cylinders are among the subjects reported.

tests for good bond. A bond that seems to be perfect as plated is weakened by heating in air. The degree of reduction in bond strength grows with the increase in temperature and time in the oven. When heating is done in a controlled or neutral atmosphere, this weakening of the bond strength does not seem to occur. This indicates that penetration of some gases through the plate is responsible for this weakening of bond strength. This theory seems to be confirmed by another factor observed, which is that thinner deposits of silver show this bond weakness at lower temperatures and shorter time in heat than do thicker deposits; also when chemicals or other materials are applied to the surface of the silver that prevent the penetration of gases, the bond weakness does not occur.

Cold rolled steel panels were plated with silver using first a nickel strike —then the usual silver strikes. The thickness of silver was varied from 0.010 to 0.030 in. The panel was then cut into ½ in. strips and the time and temperature varied on these strips from 10 to 90 min. at temperatures from 400 to 1400 deg. F. The increase in time and temperature reduced the bond strength at the surface of the nickel, so that the silver lifted from the nickel, and the bond strength increased with the increase of the silver thickness.

Test runs like this were repeated many times with the same general results. The fact that the bond failure, when it occurred, was at the nickel and silver, shows that the bond of the nickel to the steel base was satisfactory, at any pressure that was applied in these tests.

Claims have been made that phosphate coatings under the silver improve both the bond and the corrosion resistance of the silver coating. A few tests were made that indicate that just the reverse is true for both bond and protection against corrosion. The author's test shows that for the same cleaning and plating procedure, the bond weakness increases with the increase in time in the Bonderizing solution. If, however, a hydrochloric acid dip is used after the Bonderizing dip, the tendency to poor adherence is corrected. Heating at 350 deg. for 10 min. seems to correct the bond weakness caused by the phosphate coating, the same as it does for other bond weaknesses.

There is a general agreement that the protective value of nearly all electroplated coatings on ferrous metals is determined by the thickness of the metal coating, and silver is no exception to this rule. Here again, claims have been made in favor of phosphate coatings under the silver to improve the protective value of the silver coating, but, said the author, these claims do not stand up. A few of the author's experiments indicate that when the silver coating is 0.0003 in. or less, a 24 hr. salt spray test causes a greater degree of corrosion on the phosphate coating than on a non-phosphate one. This difference in protective value grows less as the thickness of the coating is increased. When the silver is 0.0006 in. or thicker there is no significant difference in the degree of corrosion on either of the two surfaces after the 24 hr. salt spray test.

This series of tests confirms another test we have made which is: when plating silver on a reasonably smooth surface, one free from pits, burrs, or rust spots, to a thickness of 0.0007 in. or thicker, the surface will be well protected and will be free from corrosion after 24 hrs. salt spray. The kind of finish put on the silver after plating seems not to be important in fixing the protective value of the silver, provided of course the silver is not removed by finishing below the 0.0007 in. thickness.

Purifying Electroplating Water

"De-Ionized Water for the Electroplating Industry," by W. S. Morrison, Illinois Water Treatment Co., described a new method of purifying water, suitable for use in electroplating baths.

The research of Adams & Holmes in 1935, developing formaldehyde resins, culminated many years of study in the field of base exchange chemistry. From the time of Way, an early discoverer of the base exchange principle of certain soil clays, to Gans in Germany, almost a generation passed before the possibilities of zeolite reactions were recognized.

Resinous Products & Chemicals Co. became the sole American licensees under the basic patents of Adams & Holmes in 1939. The next two years were spent in perfecting the resins and then in 1941 Illinois Water Treatment Co. successfully worked out the design of equipment for the commercial application of the then newly named Amberlite resins. During the period of research, the company experimented with various carbonaceous materials of a hydrogen exchange nature and successfully applied a design for the boiler water treatment field during this period.

The resins finally accepted for the water purification field were called Amberlite IR-1 and Amberlite IR-4, Amberlite IR-1 is essentially a cation exchange resin, as its most widely used function is to replace all cations for hydrogen. However, when regenerated on the sodium cycle it will replace hardness producing ions. It should be stressed here that the IR-1 is an excellent medium for the removal of simple hardness-producing elements as it has high exchange values per cu. ft. and can be subjected to much higher flow rates per sq. ft. than was ever accomplished in either synthetic or natural sodium zeolites. The material is completely unaffected in exchange value by iron or other bothersome metals and remains stable when subjected to low silica waters.

The Amberlite IR-4 is an anion exchange adsorbent which, when coupled with the effluent from an exchange column of IR-1 on the "hydrogen

cycle," produces water free from all dissolved salts.

By use of the exchanger method of removing soluble salts from a water supply it has been commercially possible to produce quantities of water under pressure that would be difficult and expensive to produce from steam stills. The quality and hourly flow rate of water demanded by many chemical processes that have used ionic removal units would have required the addition of greater steam boiler capacity if the steam still had been employed for providing the necessary water.

One installation has been in service more than two years in a porcelain enamel plant. The unit consisted of a 20 in. x 72 in. cationic reactor and a 16 in. x 72 in. anionic unit.

During troublesome periods, that is, when there was undue fluctuation in water hardness, this plant was buying steam distilled water. The objection to this practice, of course, was the high cost of the water involved for milling purposes. *De-ionizing equipment was installed and it was found that 100 gallons of synthetic distilled water was costing the same as one gallon of steam distilled water.* No difference between the action of distilled water and de-ionized water on the ground coat was detected. It has also since been found that the use of de-ionized water in this plant eliminated other manufacturing difficulties such as those resulting from the reaction in water impurities and the metal during firing.

Another installation was erected in an East Coast plant engaged in the manufacture of mirrors. This installation consists of a 30 in. in diameter by 84 in. cationic removal unit and a 20 in. x 84 in. anionic unit. In the silvering process it is necessary to have water comparable to distilled water in quality as the presence of minute traces of chlorine precipitates silver chloride. Apparently this precipitate results in a cloudy reduction of metallic silver on the mirror. The plant in question desired to enlarge its output of distilled water as it had been determined that a better production could be made if the glass prior to silvering could be rinsed with distilled water. It was estimated that 65 per cent of the fuel consumption of the plant was consumed by the steam still and that if the new procedure was to provide more water, it meant that additional steam boiler capacity would have to be provided as well as supplemental condensing equipment. Through the use of ion exchange equipment all of the demands of the plant were met without changing the steam requirements.

A third installation made a year ago in a defense plant in Florida produces 60,000 gallons of water between regenerations at a flow rate of 3000 gallons per hr. This plant is operating a large anodizing department for the oxidation of aircraft aluminum parts. The chromic acid method of oxidizing aluminum has been followed and it was found that in the hot rinse step following oxidation, the water precipitated noticeable traces of calcium salts on the anodized piece. A de-ionizing unit was piped to the bath as well as to the chromic acid tank so that make-up due to drag out was maintained with salt-free water. Whereas previously it had been necessary to employ considerable help in the polishing of aluminum parts coated with calcium deposits, once the de-ionized water was used this costly step could be avoided completely. Completely salt-free water, it was observed, was the only approach to the solution of this aircraft problem.

Using the resinous exchange materials provided new tools for research, and many interesting problems have already come to the chemist's attention, the author said. Although the reactions in almost every case involved are essentially the same, it has been noted that preferential adsorption of certain ions can be obtained. This work has led to the special adapting of the resins to the partial or complete removal of salts from various solutions, including to the recovery of copper and valuable metals in the electroplating field.

The Amberlites are being used experimentally to determine the feasibility of recovering metallic silver in low concentrations from waste rinse waters in the silver plating field. This item is typical of a number of field tests that could be conducted by research electro-chemists.

Another possibility that should be of interest is the control of pH in electroplating solutions when plating from metallic salts. Passing such solutions through an Amberlite IR-4 bed has adsorbed excess acids formed in the hydrolization reaction without disturbing the metallic cation balance.

Plating and Metal Powders

"Powder Metallurgy and Its Relation to the Electroplating Industry" was the subject of a paper by J. F. Kuzmick, Stevens Institute of Technology.

Metal powder products can be classified into metal powder specialties—things which can be made only by the powder process, and molded parts—things which can be made more cheaply by the powder process through the elimination of scrap and machining operations.

Metal powder specialties include:

Tungsten lamp filaments and other refractory metal parts difficult to make by fusion methods.

Cemented carbides such as cobalt-bonded tungsten carbide for tools, dies and other uses, requiring hard, wear-resistant surfaces.

Porous bearings which are self-lubricating by containing their own oil reservoir in the pores.

Metal filters.

Metallic friction materials, such as clutch facings and brake linings for heavy duty use.

Electrical contacts.

High frequency radio cores.

Commutator brushes.

Diamond tools—a diamond set in a metal powder mount.

Diamond wheels—diamonds bonded by a metal powder matrix.

Parts molded from metal powders include small Alnico magnets, which would be difficult to machine from castings, and a variety of gears, cams, bushings, and other machine parts, both ferrous and non-ferrous.

In the manufacture of metal powder products, the powders are compressed cold at high pressures and then subjected to a heat treatment, referred to as "sintering," usually done in a reducing atmosphere to remove oxide films and to prevent oxidation of the compact. The product may then be considered finished or it may be subjected to further treatment such as coining and annealing.

The most important methods for producing powders for molding work are:

Atomizing: Disintegration of the molten metal with compressed air or steam. Used for pure metals of lower melting points and for some alloys.

Reduction: Metallic compounds, usually oxides are pulverized into powder, then treated in a furnace containing a reducing atmosphere which deoxidizes the material to metal powder. This process is especially suitable for metals of high melting point which cannot easily be atomized.

Electrodeposition: Metals are plated from a solution in the ordinary manner, except that low metal concentration, high acid concentration, and high current densities are used. This gives a spongy deposit which can be scraped off the cathode as powder.

The result is a pure metal powder, excellent for molding work.

Other less important methods of preparing powders are machining, milling, chemical precipitation, condensation, granulation and shotting.

There is a large field for the plating industry in powder preparation. Many tons of copper powder are being manufactured by the electrolytic process. Plants for the manufacture of electrolytic iron powder are now in operation and are being greatly expanded. This will undoubtedly be one of the largest sources of domestic iron powder.

As the technique of powder metallurgy improves there will unquestionably be a demand for special alloy powders. Perhaps methods similar to brass plating can be developed to electrodeposit such alloy powders. There might also be interesting possibilities in an electrolytic coating of powder for diffusion alloying during the sintering process.

Certain metal powder products such as bearings and friction materials are welded to steel backing plates for additional strength. In order to facilitate welding, the steel is coated with tin plate or copper plate or other such coatings. There is unquestionably room for development along this line, particularly with regard to such materials as stainless steel, to which it is difficult to make metal powder compacts adhere.

The plating of metal powder parts for protective coating should be very important. Since most metal powder parts are somewhat porous, they are particularly harmed when subjected to corrosive atmospheres. Plating with a corrosion-resistant metal should be a good solution to this problem, the author concluded.

Steel Embrittlement by Zinc

"Zinc—Saboteur of Steel at Elevated Temperatures" was read by Franklin Page, Jr., laboratory foreman, Solar Aircraft Co.

The embrittling effect of molten zinc on stressed steel has long been known, but has received very little publicity. For 15 years Solar Aircraft Co. has been forming stainless steel with zinc alloy drop hammer tooling. It was soon discovered that all zinc "picked up" on the stainless by contact with tooling must be completely removed before welding or heat treatment. If this cleaning process was omitted the parts were invariably cracked during the heating cycle. Laboratory experiments demonstrated that when steel is stressed near its elastic limit or its fatigue limit in contact with molten zinc, cracking invariably resulted. The magnitude of the crack is approximately proportional to the quantity of zinc in contact with the steel and the duration of the heating peiod.

Stainless steel is not the only material which will be cracked by zinc in combination with stress and heat. This weakness is found in some low carbon steels, in SAE 2330 aircraft bolt steels, in SAE 4130, and in every other steel and iron alloy tested by the company.

Because of this effect, zinc plating must not be substituted for cadmium or any steel aircraft part which will operate at a greatly elevated temperature, unless a careful study has shown that the part in question is not subjected to high stresses.

It was proposed to substitute zinc for cadmium on brackets and other parts which are assembled directly to aircraft exhaust manifolds. Had this substitution been made, failure of both the manifold and the bracket might have resulted after an extremely short service life.

The most alarming substitution is the use of zinc plating on aircraft bolts. Many in the industry have said that they are vigilantly guarding against zinc plating, but exhaust manifold bolts are usually replaced at every engine overhaul and the mechanic in the field is likely to use any bolt of the right size which is available. If zinc plated bolts are available to him, failures of the exhaust systems in service may result, possibly causing the loss of the aircraft and crew.

The author has no argument with the substitution of zinc for cadmium in cases where moderate corrosion resistance is the only factor under consideration, but zinc plating, he said, must not be allowed in contact with any part which operates at a temperature above 700 deg. F. and preferably should not be used at all in power plant assembly.

"Hard Chrome Plating" was the topic of a paper by Austin Fletcher, Brewer - Titchener Corp., who said racks should be made of copper and without exception must be able to carry more amperage than will be required for the job. They should be constructed with bolts, nuts and washers and with tight copper clamps which, when pulled up, will be tight against the spine of the rack. It should be noted that spring clips, etc., do not work very well.

Inside anodes are required for all inside plating. Steel usually works very well. For work of this type, the rack is usually built first, to hold the object to be plated. When it is securely held in position, the inside anode is built on the rack, insulated of course, and a connector put on for attaching to the anode rod. All inside plating should be done with the widest end of the cavity to the top whenever possible.

The regular cleaning and muniatic acid dip are sufficient before brushing with pumice stone. Then the work goes into hot water until the object is heated through. Reverse current is applied in the chromium plating solution for 1 to 3 min. and without removing the rack, plate is started with low amperage and continued up to 4 to 8 amp. per sq. in. A hot water rinse is followed by baking at 300 deg. to 500 deg. F. for 1 to 5 hr.

In general, the best thickness for most types of cutting tools is 0.0001 in. of chromium. Above that, anything may happen!

Steps to be followed in chrome plating dies are: Pack properly; that is, so that the die is firmly held; clean thoroughly in cleaner solution; rinse in cold water; acid dip, till rust or scale is off; rinse in cold water; brush with pumice stone so that when rinsed in cold water there are no breaks; rinse thoroughly; let stand in hot water until die becomes hot; re-rinse in chrome solution for 1 min.; plate in chrome solution, starting with enough amperage so that the solution will work; gradually work amperage up to the desired figure; plate dies at 4 amp. per sq. in.; after plating, rinse in hot water thoroughly till die becomes hot; heat treat in oven at 300 deg. F. for 1 or 2 hr.

Chrome Plating Engine Cylinders

"Porous Chrome," by H. Van der Horst, Van der Horst Corp. of America, dealt with the company's process of porous chrome plating engine cylinders and piston rings. The process, it was said, serves to reduce cylinder wear, ring wear, ring groove wear and, in general, tends to produce a more reliable engine; also to reclaim worn aircraft cylinders. The chrome deposit must be porous for lubrication purposes because ordinary dense chrome does not wet with oil.

Extensive investigations have been made to reduce cylinder wear, chiefly in the direction of alloyed cast iron, but also by using nitrided cast iron and nitrided steel for cylinder material. This work has reduced the wear to some extent, but the engine designers have counteracted this by designing engines of much higher power, in which wear is much more serious. For that reason, chromium plating of engine cylinders was investigated.

Of course there was trouble. Plated high speed engine cylinders readily scuffed. Several engine blocks for automobile engines were plated and in every instance scuffing of the cylinder bore and of the piston rings was noticeable, and always of the same character, namely, at the lower end of the bore at the thrust and anti-thrust sides. The cylinder bores were plated with ordinary hard chromium to the right size of the bore and then finish honed, giving a finish which closely resembles a polished decorative chromium. The reason for these failures was the lack of lubrication.

A piece of chrome plated cylinder was taken to a gathering of lubricating experts who tried all sorts of oils and concluded that none of them would work. Smooth dense chrome does not wet with oil. To platers with experience this is not surprising.

There was, however, one little high speed engine running with chromium bores and performing very well. The reason for the difference was the fact that the cylinder of this engine had been plated and stripped more than once and after each stripping the cast iron bores had to be honed, so finally the coating of chromium to build back to drawing size was very thick and rough. The subsequent honing had not given an entirely smooth bore, but had left a lot of pits and depressions. Here then was the answer to the difficulty. *It is essential that chromium be porous or provided with a multitude of pits and depressions which will serve as oil reservoirs.*

The best method found to obtain a porous chromium deposit was to plate on a smooth surface, to obtain a workable and machinable coating of chromium. The coating should be about 0.002 in. to 0.003 in., more on the diameter than is necessary for bore size. The cylinders are then put in another tank containing another solution with the same anodes and the same set-up, but the current is reversed for a few minutes. In other words, the chromium is stripped. This, however, results in the removal of metal in depth and not in layer.

It must be emphasized that the proper design and maintenance of anodes is very important. It will be readily understood that if there is a difference in centering of anodes in a six cylinder block, or if there is a difference in diameter of anodes resulting in a difference in the gap between anode and cathode, then there must be a difference in voltage. If there is a difference in voltage, there is also a difference in current density and that naturally is fatal because there will then be a thicker deposit in one bore than in another, or a deposit in any one bore may be present which is not uniform in thickness.

It has been found, for example, that a large diameter anode gives a heavier deposit at the end of the cylinder which is down in the solution. The proper way to avoid such a heavy deposit at the bottom end is by tapering the anode. The degree of such a taper depends entirely upon the current density used. In a cylinder of five-in. bore, using an anode of 4¼ in. diameter and applying a current density of 4 amp. per sq. in., the taper of the anode may well be ⅛ in., so the bottom end is then 4⅛ in.

In plating at a lower current density of, say, 2 amp. per sq. in., tapering of the anode is hardly necessary, although in blind-end cylinders such as air-cooled aircraft engine cylinders, a tapered anode is preferred even though the cylinders may be plated at a low current density.

Chrome Plating Rack Design

"Racking in Hard Chrome Plating" was discussed by Arthur W. Logozzo, Hartford Chrome Corp. Any type of plating will involve three factors — chemical, electrical and mechanical. In hard chrome plating the chemical factors are very easily controlled. The electrical factors are more difficult but not exceedingly so. The mechanical factor of hard chromium does present a real problem however, and requires a constant, intensive study.

A chromium solution combines poor throwing power, low current efficiency and intensive and concentrated gassing at cathode and anode, to give the plating industry its poorest all-around solution. To combat this combination of hard-working gremlins, it is necessary to work through the medium of rack design. Further complicating this interesting situation, much of the work consists of a mess of miscellaneous parts containing sharp edges, odd shapes and deep depressions.

The keynote in rack design should be simplicity and flexibility; simplicity to reduce time in construction, conserve material and permit an unskilled or semi-skilled laborer to operate the rack; and flexibility so the rack can be used for several different jobs, eliminating a cluttered, needless rack storage.

One of the exceptions to the "octopus" auxiliary anode for plastic mold plating is the button plate containing 480 dies. Work of this type merely requires two heavy straps bolted to the back for contact and the ordinary flat anode hung in front.

Almost all gage manufacturers now plate plug gages. The standard plug holder is employed and the plugs are arranged one in the top and one in the bottom, with the ends almost meeting in the center of the anode, thieving from each other to eliminate burn at the ends. This also tends to give a more uniform deposit over the length of the gage.

Chrome plated snap gages are quite the vogue, as the manufacturer realizes the feasibility of salvaging his snaps through this medium. If these gages came to the plater in large quantities of the same size, they would present no racking problem. It would merely be a question of how many could be stacked together. Unfortunately, when 100 of the snaps are sent to the plating department, they are of 100 different sizes. A good rack for this work uses battery clips to hold the gages; it will handle 48 per bar or 96 per load. Due to the small area plated, the amount of current drawn is negligible. The anode is fixed in position by means of a set screw. The anode consists of a ¼ in. in diameter lead wire, with four ⅛ in. in diameter wires attached to it. The ⅛ in. wires are flattened out to conform to the size of the gaging area. The anode and cathode units are again correlated, built in units insulated one from the other, with rigidity featured. Rapid loading and unloading, using the same anodes for different sized gages, is another desirable feature in this rack.

The hard chrome plating of drawing dies is playing an important part in the high production of shells. The requirements of a plated draw die of this type are more exacting than prewar requirements ever dreamed of being. Closer tolerances, new drawing techniques that permit only a light buffing after plating, mean plating within 0.1 or 0.2 in. of the correct size. These dies are being plated very nicely on racks where again rigidity is the password. As many as 96 dies are plated at once by stacking them back to back. The anode wire is easily changed to conform to various sizes of die holes.

A propeller section with a plated bearing surface was racked by showing a long bolt through the middle, using washers at either end and clamping to work bar. A dozen or more of these can be plated at the same time, in a 3 ft. x 4 ft. tank, without any outlay of money for racks. Crankshafts are handled much the same, by capitalizing on the holes in the part. In fact, most parts with a

lot of holes make the racking problem much easier.

When plating more than one diameter of a part, it is best for economical reasons, plus more rapid expediting, to arrange to handle all sections in one operation. Stopping off must be carefully controlled, as well as the anode arrangement; otherwise the current density requirements will be excessive, limiting the number of units per load. Heavy leads are demanded to eliminate a building up of resistance in the rack through overheating.

As a direct result of the conversion to war materials, industry has built up an unprecedented scrap heap. In solving the problem of salvaging as much of this work as possible, without rebuilding the actual parts, the hard-chrominum medium has been drawn upon heavily. Consequently, many new hard-chromium shops came into being, run by men that six months ago or a year ago had not seen a hard-chrome setup. Now many are predicting better and bigger things for hard-chrome after the war, notwithstanding the fact that 90 per cent of the war business is salvage, predicated on the necessity for salvaging regardless of cost; this is in addition to the fact that nothing new has been developed to improve the low efficiency of the chromium bath. Rack design is the medium through which the future of hard chromium in industry will be determined.

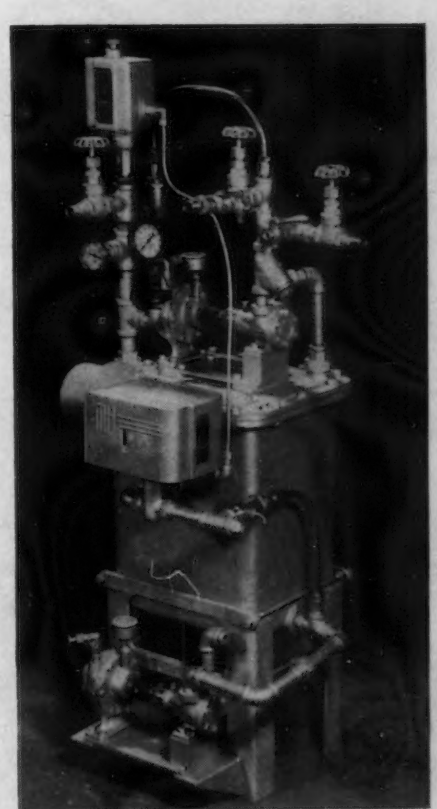
Next week, in the third part of this report, papers on industrial paint coatings, saponification rates and many aspects of surface preparation are reported.

High Temperature Spraying of Paints

IT has been found that by spraying very viscous materials such as airplane dopes, varnishes, lacquers, paints and oils at elevated temperatures, heavier coats can be applied without runs or sags and that saving in labor and material can be achieved by reducing the number of applications. The DeVilbiss Co., Toledo, has developed two types of heater units for this purpose, one of which uses hot water and the other steam.

Experience with materials up to 500 sec. viscosity has been satisfactory if heated to 190 deg. F. and sprayed at a pressure of 80 lb. However, due to the varying grades and ranges of viscosity of the materials on the market, definite rules regarding temperatures of the material or spraying pressures cannot be set up with any certainty and should be determined by either actual test or based on the recommendations of the material manufacturer. In order to cover the variations, the heaters have adjustments for temperature, fluid pressure and flow of material. The temperature may be regulated between 110 and 190 deg. F., fluid pressure from 20 to 80 lb. (depending upon the viscosity of the material), and fluid flow from approximately 1 to 8 pints per min.

Type QBH-521 (illustrated) consists of a hot water heater mounted on legs, having tinned copper coils with an area of 15 sq. ft. and a capacity of 1½ to 2 gal. A hot water circulating pump mounted on top of the heater circulates the water from the hot water supply tank through the unit and back to the tank. A strainer mounted on the suction side protects the pump from foreign matter and dried material and avoids clogging of the spray gun. It is completely automatic, having a temperature control of the material being sprayed within a range of 5 deg. F. through means of a thermostat and thermostat-operated hot water inlet valve. Because of the high temperature of the water (195 to 205 deg. F.), copper, monel or similar tanks are recommended. The output capacity of the hot water supply should be at least 20,000 B.t.u. per hour for each gun in operation, based on the consumption of 1 qt. of material per gun per min.



HOT water operated unit for heating paint up to 190 deg. F. This heating unit is completely automatic, having a thermostat and air operated hot water inlet valve which permits a temperature control of the material being sprayed within a range of 5 deg.

Another unit, Type QBH-520, the same as the one described above, is furnished without the thermostat and automatic hot water inlet valve, for those who have a thermostatically controlled supply of hot water. There is also available a steam operated unit, Type QBH-501, which is similar in construction to the heater described, except that it has an automatic steam valve controlled by an air-operated thermostat.

For use in conjunction with the above heaters, Type MBC spray gun with No. 765 air cap has been specially designed for the application of materials at elevated temperatures. A twin fluid tube, attached to the inlet of the spray gun, permits the circulation of hot materials to the gun and back to the heater, insuring complete circulation and heated material at every pull of the trigger. Solvent resisting fluid hose which is capable of withstanding temperatures of at least 180 deg. F. is recommended, since old style hose with ordinary liner may break down at high temperatures and cause trouble.

Standard 2 to 60 gal. capacity pressure feed paint tanks, which provide a reserve of unheated material and replenish the material as it is used up, are provided with an extra air regulator for controlling the thermostat valve. The safety valves are set for 30 lb. pressure.

▲ ▲ ▲ The Annealing of S

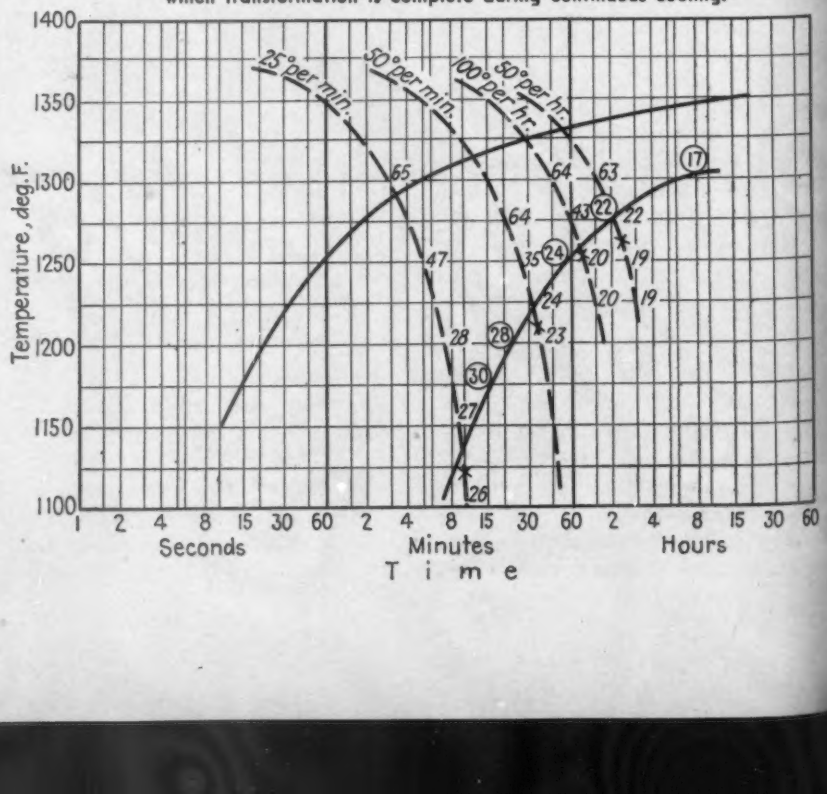
. . . The author continues his five-part article, of which this is the third section, with a discussion of the correlation between transformation at constant temperature and transformation during continuous cooling. Previously he discussed the principles which have superseded those of slow cooling annealing, and described how to construct transformation-time-temperature curves for annealing use.

ALTHOUGH the discussion so far has been confined to the transformation of austenite at constant sub-critical temperatures, it is, of course, true that austenite also transforms during continuous cooling, with the transformation proceeding gradually just as it does at constant temperatures. The temperature at which transformation begins and at which transformation is completed, during continuous cooling, can be determined in much the same manner as is used in determining the times for beginning and completion of transformation at constant temperature.[18, 19] A number of small samples are austenitized in the same furnace and then, as the furnace is cooled at a constant rate, pieces are removed at regular intervals, quenched, and examined for structure. For example, Fig. 9 shows the progress of transformation of a 0.81 carbon steel, austenitized at 1450 deg. F. and cooled at the very slow rate of 20 deg. an hr. After the steel was cooled continuously for 5 hr. from 1450 deg. to 1350 deg., it was found that the condition of the steel was the same as it was when the cooling started. However, a slight change was found after a further drop in temperature to 1340 deg. F., and an appreciable amount of transformation was evident in the sample which cooled at 1330 deg. (Fig. 9a). Figs. 9b, 9c and 9d show the amounts of transformation product present in the steel after it had cooled to 1320, 1315, and 1295 deg. F., respectively. From these data it may be concluded that during the continuous cooling of this plain carbon tool steel from 1450 deg. at the rate of 20 deg. an hr., transformation began when the steel cooled to about 1335 deg. and was completed after it had cooled to about 1290 deg.

It has been found[20] that there is a definite relationship between transformation during continuous cooling, and transformation at constant subcritical temperatures. If the continuous cooling curve is plotted with its origin at the critical temperature (not at the austenitizing temperature) and superposed on the constant temperature TTT curve, the beginning and end of transformation during continuous cooling will be found at points on the cooling curve somewhat below and to the right of the intersections of the cooling curve and the isothermal curves for beginning and end of transformation. This is illustrated in Fig. 10 which shows these relationships for Ketos, the Mn-Cr-W oil hardening non-deforming tool steel, between the completion of transformation at constant temperature and the completion of transformation during continuous coolings at rates between 25 deg. a min. and 50 deg. an hr. On the basis of these and other data, it is safe to assume that transformation during continuous cooling is completed at a temperature no lower than 50 deg. F. below the intersection of the superposed cooling curve and the end-of-transformation line of the TTT curve.

Because of this simple relationship it is possible to establish from the TTT curve of a steel the rate of cooling necessary in a continuous cooling annealing operation to produce the desired structure (and hardness) of a steel and the temperature at which it is safe to remove the steel from the furnace and finish cooling to room

FIG. 10—Correlation of transformation during continuous cooling and transformation at constant subcritical temperatures. Ketos steel (0.91 C, 1.21 Mn, 0.29 Si, 0.55 Cr, 0.49 W); austenitizing temperature, 1450 deg. F. Numbers on cooling curves indicate Rockwell C hardness of samples cooled at these rates and quenched from the temperature at which number appears. Numbers in circles on line for end of isothermal transformation indicate Rockwell C hardness of products formed at transformation temperatures at which number appears. Crosses on cooling curves indicate temperature at which transformation is complete during continuous cooling.



Steel

o o o

By PETER PAYSON
Chief Research Metallurgist, Eastern Research Laboratory, Crucible Steel Co. of America

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temperature at a rapid rate. This is illustrated in Figs. 11, 12 and 15.

Fig. 11 is the TTT curve of a 1.15 carbon tool steel and superposed on it are cooling curves for rates of 900 deg. F. an hr, 100 deg. an hr. and 20 deg. an hr. Because the upper portion of the curve is flat, all the cooling curves intersect the end of transformation line at temperatures between 1300 and 1330 deg., which means that for any of these cooling rates the transformation will be complete at temperatures no lower than 1250 deg. The steel cooled at any of these rates could therefore safely be cooled in air after the temperature of the steel has dropped to 1250 deg. The hardness of the steel cooled at 900 deg. an hr. would be about 18 Rockwell C, whereas that cooled at 20 deg. an hr. would be about 10 Rockwell C. Since it is known[11] that steel of this type transforms to a structure containing some lamellar pearlite at temperatures below about 1325 deg. F., it would be necessary to cool the steel at a rate sufficiently slow to permit all transformation to be complete at about 1325 deg. if a completely spheroidal structure should be desired. Since the superposed cooling curve of 20 deg. an hr. indicates that transformation during continuous cooling at this rate would be complete at about 1320 deg. or a little lower (that is, 10 to 20 deg. below the intersection of the cooling curve and the curve for and of isothermal transformation), it would be necessary to cool the steel at a rate no faster than about 15 deg. an hr. to assure a structure which is practically free from lamellar pearlite.

Fig. 12 is the TTT curve of NE 8949 with the same three cooling rate curves superposed on it. It is clear that at the relatively rapid rate of 900 deg. F. an hr., this fairly deep

Fig. 9a

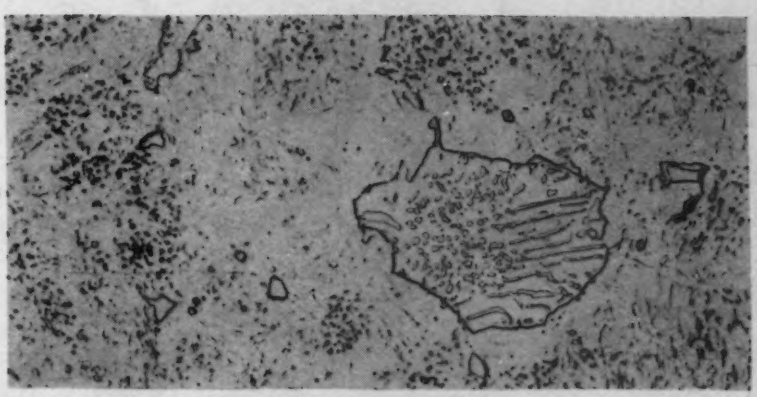


Fig. 9b

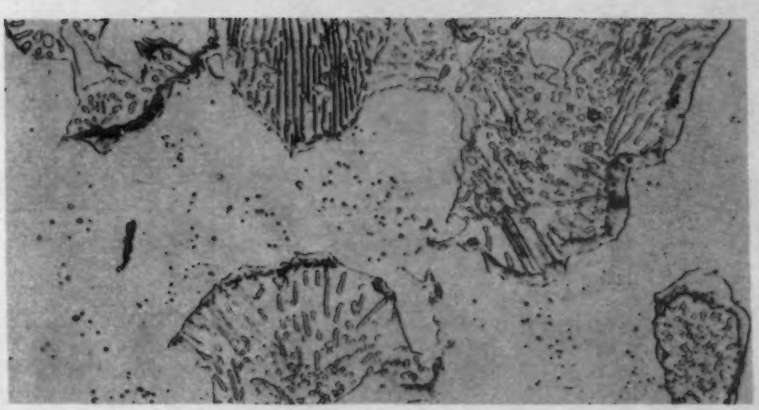


Fig. 9c

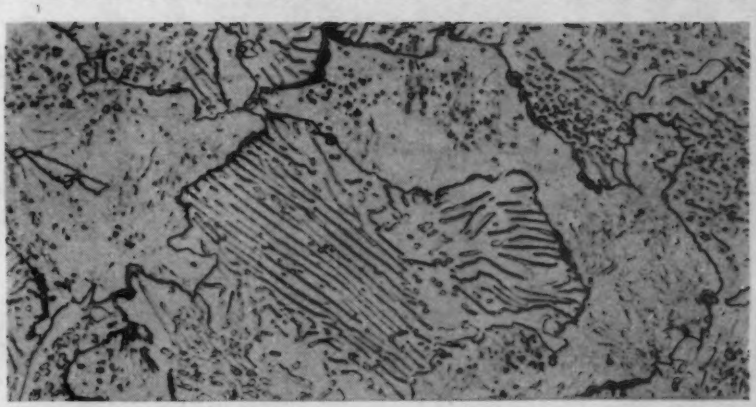


Fig. 9d

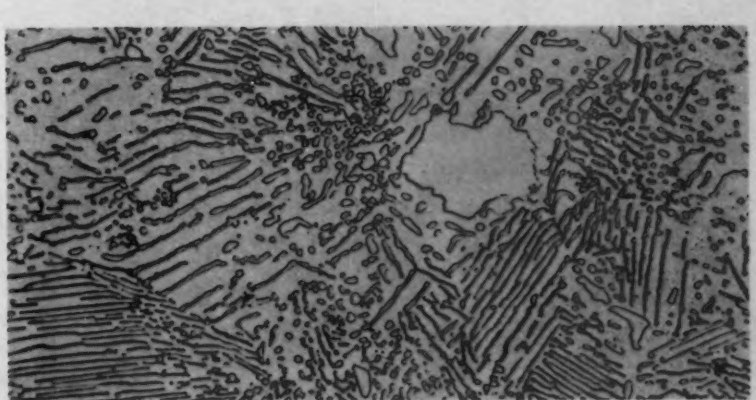


FIG. 9—Progress of transformation in 0.81 carbon tool steel during continuous cooling from 1450 deg. F. at the very slow rate of 20 deg. per hr. The sample shown in photomicrograph 9a was quenched after being cooled to 1330 deg. in 6 hr.; that in 9b after being cooled to 1320 deg. in 6½ hr.; that in 9c after being cooled to 1315 deg. in 6¾ hr.; and that in 9d after being cooled to 1295 deg. in 7¾ hr. Etched in nital-picral; magnification, 1000 diameters.

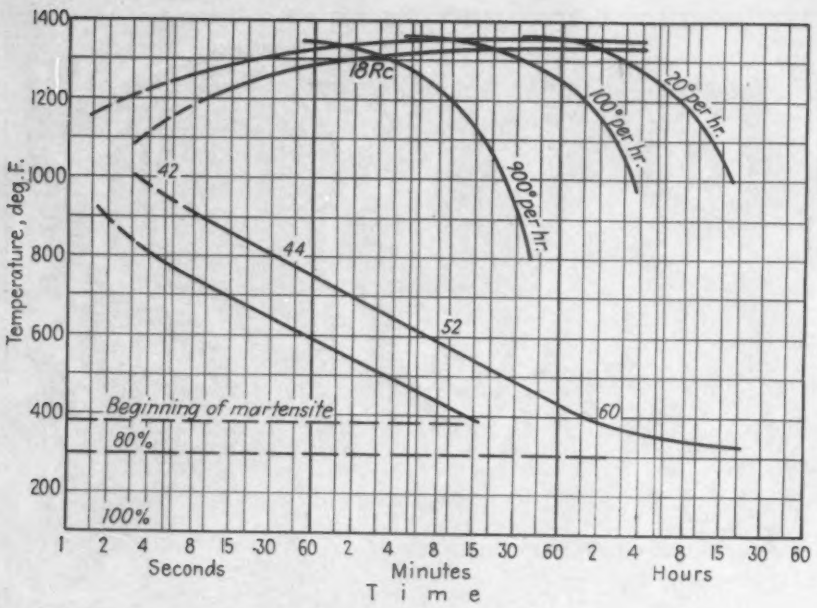


FIG. 11—Continuous cooling curves for 900 deg. F. per hr., 100 deg. F. per hr., and 20 deg. F. per hr., superposed on TTT curve of Extra Tool Steel (1.14 C, 0.22 Mn, 0.16 Si); austenitizing temperature, 1450 deg. F.

hardening steel will transform only in the region from about 900 to 600 deg.; and that since the products of transformation at these temperatures are between about 33 and 44 Rockwell C, the steel will be too hard for machining if it is cooled at this rate. The cooling curve for 100 deg. F. an hr. intersects the end of transformation line at about 1225 deg., which means that the steel would be completely transformed after it had cooled to about 1200 deg., and the hardness would be about 20 Rockwell C. Since this cooling curve also intersects the ferrite line, it may be concluded that the structure of the steel as cooled at 100 deg. an hr. would consist of ferrite and pearlite. Finally, if this steel

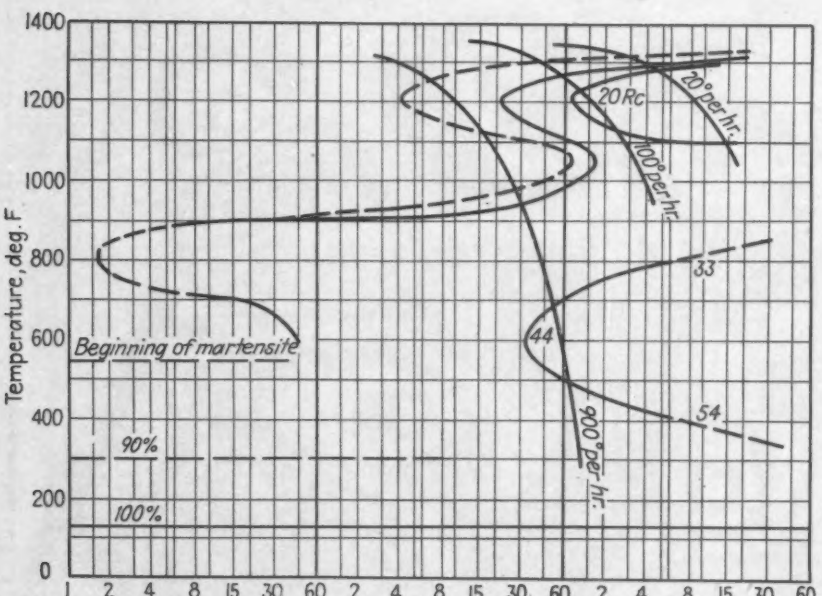


FIG. 12—Continuous cooling curves for 900 deg. F. per hr., 100 deg. F. per hr., and 20 deg. F. per hr., superposed on TTT curve of NE 8949 (0.49 C, 1.01 Mn, 0.20 Si, 0.54 Ni, 0.56 Cr, 0.38 M.). Austenitizing temperature 1500 deg. F.

were cooled at 20 deg. an hr., transformation would be complete at about 1250 deg. and the structure again would be ferrite and pearlite, but the amount of ferrite would be greater and the pearlite would be coarser than in the structure formed at 100 deg. an hr.

As a third illustration of the use of the TTT curve for establishing the proper rate of cooling for satisfactory annealing, Fig. 13 is shown for the high alloy steel, SAE 3312. In this case, neither the 900 deg. an hr. nor the 100 deg. an hr. cooling curve intersects the end of transformation line until a temperature of about 875 deg. is reached. The products formed

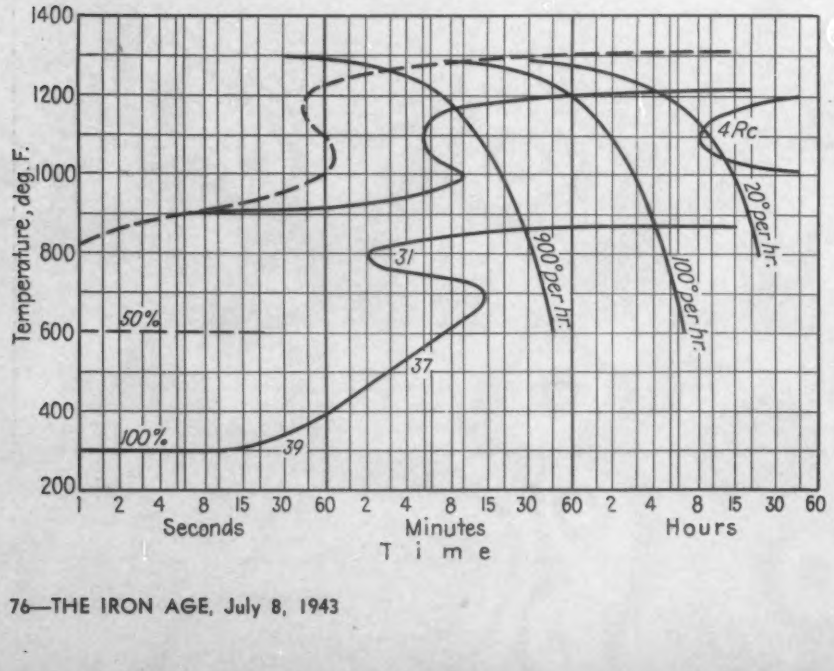


FIG. 13—Continuous cooling curves for 900 deg. F. per hr., 100 deg. F. per hr., and 20 deg. F. per hr., superposed on TTT curve of SAE 3312 (0.10 C, 0.34 Mn, 0.20 Si, 3.51 Ni, 1.66 Cr, 0.06 Mo); austenitizing temperature, 1450 deg. F.

at the temperatures near this limiting temperature are fairly hard, about 30 Rockwell C, and it is therefore to be expected that this steel cooled at these rates would be unsatisfactory for machining. The curve for 20 deg. an hr. crosses the end of transformation line at about 1125 deg., and therefore the steel cooled at this rate would be completely annealed if it were removed from the furnace at about 1075 deg. However, in view of the fact that at this cooling rate the steel is in the region of ferrite separation, between 1300 and 1200 deg., for a long time, it is to be expected that the steel would contain a large amount of ferrite, and, as will be seen later, that this ferrite would be arranged in bands.

These three illustrations of the use of cooling curves superposed on TTT curves for setting up continuous annealing procedures will serve to demonstrate this method in connection with TTT curves of all steels. Once the TTT curve of a steel is known, the selection of the procedure for annealing, by either constant temperature holding or continuous cooling, will depend on the equipment available for the operation. Although the subsequent discussion refers principally to constant temperature transformation annealing, it should be understood that the same results could also be obtained by properly selected continuous cooling procedures. For demonstrating the use of the TTT curve in setting up annealing cycles it is more convenient to use constant temperature procedures.

References

[18] M. A. Grossman, "Principles of Heat Treatment," 3rd edition, 1940, ASM, pp. 13 to 20.

[19] R. J. Hafsten, "Spheroidize Annealing of SAE 52100 Steel," Metal Progress, vol. 42, 1942, pp. 869 to 873.

[20] R. A. Grange and J. M. Kiefer, "Transformation of Austenite on Continuous Cooling and Its Relation to Transformation at Constant Temperature," Trans. ASM, vol. 29, 1941, pp. 85 to 114.

Editor's Note—Next week, in the fourth part of this five-part article, the author discusses annealing cycles based on time-temperature-transformation information, and presents a large number of TTT curves for a variety of steels.

Primer for Machine Shop Beginners

THE newest stars in the plant service flag these days are likely to be replaced by women whose acquaintance with machinery is limited to the sewing machine and by men who drive cars but hardly know how to change a spark plug. The newcomer's brief period of instruction is usually limited to imparting the bare fundamentals of the job. He or she is left to acquire, as best he may, background knowledge as to why the job should be performed a certain way and how it ties in with the work of others. Obviously, until this background is gained his interest in his work is certain to be tepid, and he is likely to be a generous contributor to a high absenteeism rate and active labor turnover.

To help solve the problem of giving the machine shop beginner a fund of background knowledge, the Herbert D. Hall Foundation has brought out a "Machine Tool Primer," cloth bound, 280 pages, 7 in. by 10 in., illustrated, written in layman's language.

The primer leads the beginner through every department of the machine shop. But before the mysteries of the automatic lathe or even the simplicities of the ordinary drill press are unveiled to him he is told how machine tools fit the economic scheme of things, and how they place within reach of his purse the things that make life comfortable.

He is introduced to jigs and fixtures, to micrometers and gages. He is told why jobs are time studied and analyzed. He is taught how to read an operation sheet and a simple flow process chart. The primer schools him in the rudiments of manufacturing cost finding.

After serving his novitiate, so to speak, he is then instructed in the functions and operating methods of the different classes of machine tools: drills and drilling machines, lathes, planers and shapers, milling machines, grinding machines, presses, and so on.

The book contains close to 400 illustrations, which are either operating photographs or beautifully executed pen and ink sketches that present a clear and simple picture of points brought out in the text. The elements of machine tool operation have probably never before been so graphically presented.

Although the primer was prepared for kindergartners, it is so comprehensive that it is certain to be read widely among the industry's graduates. The publisher of the book, the Herbert D. Hall Foundation, 1060 Broad St., Newark, N. J., is a nonprofit-making organization founded by Herbert D. Hall, a machine tool dealer. The authors are Foundation members, one of whom and principal contributor to the book is Frank J. Oliver, technical editor of THE IRON AGE.

The price of the book is $1.50. It should be in the library of every plant operating a machine shop, and will undoubtedly be bought in quantity by those manufacturers faced with the problem of converting green hands into competent machine operators in the shortest possible time.

Synthetic Rubber-Coated Gaskets

GASKETS made of copper mesh coated with synthetic rubber, originated by the Detroit Gasket & Mfg. Co. and produced by the Goodyear Tire & Rubber Co., have survived exhaustive tests and are now standard equipment for many airplane engines produced in this country. It is expected that the gasket may be successfully adapted to other types of United States and British warplanes as soon as production facilities are available.

Less than 0.015 in. thick, the 80-mesh copper screening, which is used in making the gaskets, has a tensile strength far in excess of any internal pressure which may be encountered. The synthetic rubber coating provides the necessary binding medium and also provides the resiliency required to obtain perfect alinement in the assembly.

It is claimed the gaskets have high tensile strength, flexibility, resiliency, oil resistance, dimensional stability and accuracy. They were developed to replace the type which used asbestos, fiber or similar material to seal the crankcases of airplane engines to prevent losses of vital oil by seepage, blowouts or similar causes.

Resistance Welding of Tool Steel

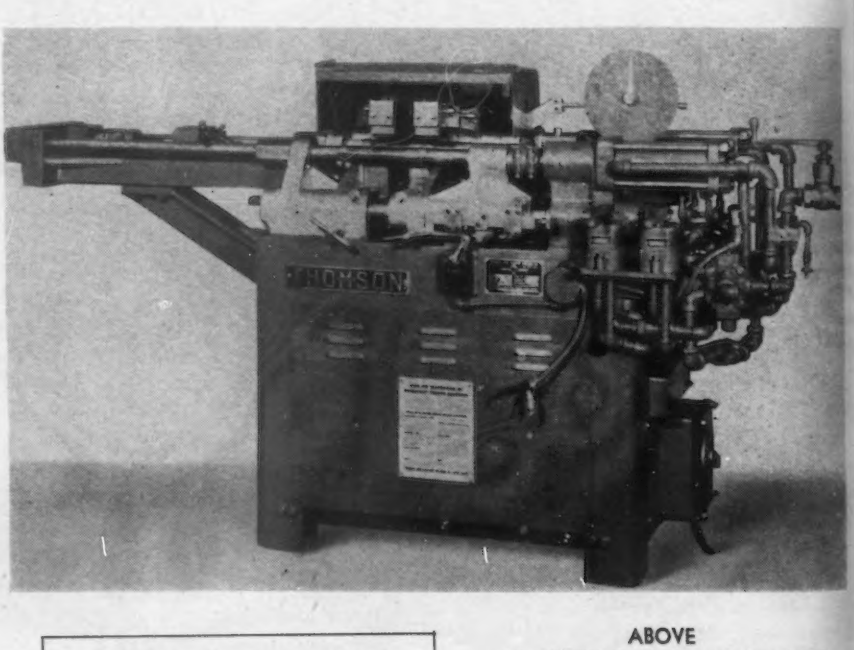
PRECISION flash welding is being increasingly employed for the joining of high speed steel tips to low carbon shanks of drills, reamers, taps, broaches and cutting tools of all sorts. Modern flash welders of the type illustrated have been found capable of performing this work so accurately that the finished pieces require no straightening and only a minimum of finishing. Tips are securely attached and there have been no evidences of failure at the joint. The flash welding operation is quick and economical.

The accompanying sketches show some of the more common applications of this process. In addition to regular tool production these flash welders are sufficiently flexible to be useful in general toolmaking work and in the construction of jigs and fixtures. Shops that have a precision tool welder of this kind find that they can use it for rapid repair work that might otherwise require hours of forging or machining or a long wait for the delivery of standard replacement parts.

Precision flash welders are available in the size and type to meet almost every tool and maintenance application. There is a small 5 kva. machine for precision welding of twist drills and taps, 1/16 to ¼ in. diameter. Work from ⅛ to ⅝ sq. in. can be handled in welders of 20 to 50 kva. capacity. The Thomson Model F-7, made by the Thomson-Gibb Electric Welding Co., Lynn, Mass., is equipped with air operated clamps individually controlled by foot valves so as to leave the operator's hands free for handling and lining up the work. The clamps are completely adjustable to suit the size of the work and, where desired, the welder may be equipped with overhanging dies and with foot operated clamps and hand push-up.

A larger size Thomson unit is the Model F-23, illustrated, with transformer capacity of 100 kva. It is capable of handling a wide range of work up to 1 7/16 in. diameter or its equivalent in square inches of an irregular shape. This machine is equipped with hydraulic push-up and stock clamping action. Push-up is regulated by a four-way valve for close control. Current cut-off is controlled by a dog attached to the platen engaging a micro-switch. A large dial shows speed of platen travel during flashing. The work stops are adjustable to 30 in. at the left and 12 in. at the right.

The Thomson Model F-29 precision flash welder is designed for heavy work—stock up to 3⅛ in. diameter or 7.7 sq. in. With transformer capacity of 300 kva., it is capable of as precise adjustment as the smaller machines and is designed to prevent distortion of the work. Hydraulically operated, it is capable of exerting end pressures in excess of 16,000 lb. per sq. in.



ABOVE

THOMSON - GIBB Model F-23 precision flash welder, with 100 KVA. Transformer capacity, will butt weld tool stock up to 1 7/16 in. diameter or equivalent area. The dial at upper right shows speed of platen travel during flashing.

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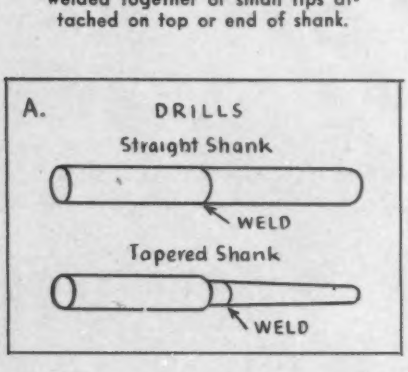
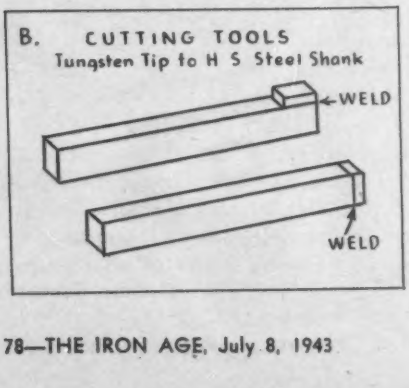
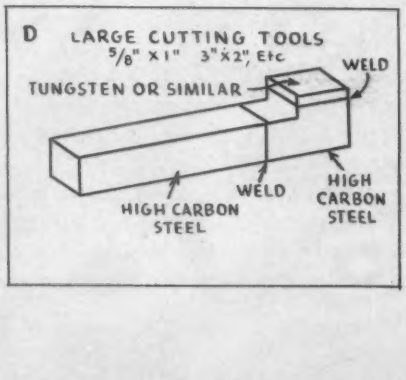
BELOW

EXAMPLES of composite tools made by resistance welding high speed steel tips to low alloy shanks. In the case of cutting tools, large sections may be butt welded together or small tips attached on top or end of shank.







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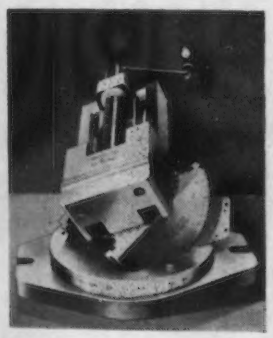
New Equipment . . .

Small Tools

New developments in vises, lathe and milling machine attachments, die heads, dressing tools, etc., are described and illustrated in the following.

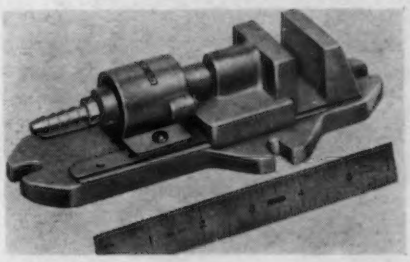
Precision Vise

THE universal precision machine tool vise offered by *Wesson Co.*, Ferndale Station, Detroit, may be mounted on any machine tool and permits angular work on such operations as milling, drilling, grinding, boring, reaming, slotting, tapping, etc. with tool room accuracy at high production speeds. It may be moved from one machine to another without disturbing the angle or removing the work. The vise swings through 180 deg. in the top plane, 90 deg. in the vertical plane, and 360 deg. in the bottom plane, and is completely graduated in all planes, with vernier graduations available at additional cost. Made in two sizes, No. 1 has a jaw opening up to 4 in. and is 6⅛ in. high overall, and No. 2, with jaw opening up to 1⅜ in., is 4⅜ in. high overall. Both may be equipped with angle plate for parts that are too large or of shape too irregular to be held securely in vise.



Midget Air Vise

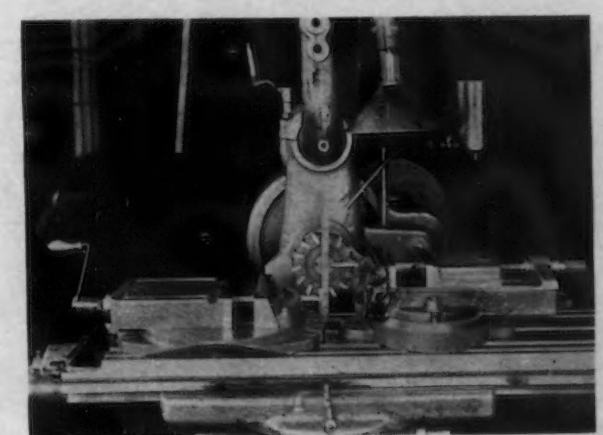
AN unusually small unit, Model 10, which can be used for a variety of light drill press operations, bench assembly jobs and light milling jobs such as screw slotting operations, has been put on the market by *Mead Specialties Co.*, 15 South Market Street, Chicago. Its small compact size and low silhouette make it especially useful on bench milling machines. The jaw slides on dovetail ways, assuring smooth action and parallel grip. It is ordinarily used with a foot control valve. Maximum stroke is ⅝ in. Three locations for the cylinder are provided to give jaw openings from



0 to ⅝ in., ⅝ to 1¼ in., and 1¼ to 1⅞ in. A larger model, No. 42, is furnished with either hand valve or with one or two types of foot control valves.

Swivel Vise

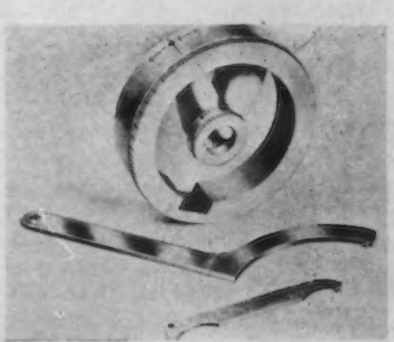
THE *Williams Machine Co., Inc.*, Poultney, Vt., has brought out a swivel vise for holding machine parts on work tables. It has been designed to bring the bottom of the gripping jaws only 1⅜ in. from the work table, which results in less vibration and



chatter, better finish and more accurate work. Because the work is held low, an additional 2½ in. or more vertical range is made available on the machine upon which it is used. The large clamping screw is fully enclosed. The jaw plate is held in the center ring in such a way as to maintain parallel clamping of the vise jaws. Both the fixed jaw and sliding jaw are forced into pressure contact with the outer rim of the base, which further clamps the swivel adjustment and adds to the swivel lock provided to insure the positioning of the swivel position. Sizes having 7 in. and 6 in.-wide jaws are available from stock.

Milling Cutters Spacing Collars

THE *Dayton Rogers Mfg. Co.*, Minneapolis, announces micrometer spacing collars in sizes from ⅞ to 5½ in. It is claimed they not only

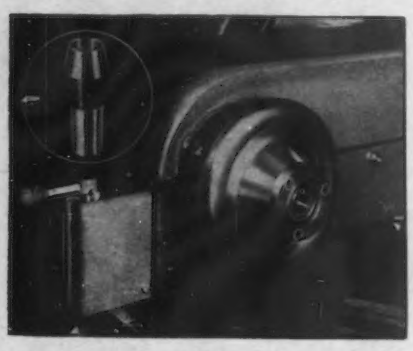


eliminate cutter arbor shims, but give the required positive adjustment for spacing of straddle mills without removing any of the cutters or collars from the milling machine cutter arbor. A special pin spanner wrench is furnished with each size, making it possible to quickly adjust the spacing collars as to the plus or minus dimension required in connection with the direction indicator engraved on the outer sleeve of the collar.

Lathe Attachment

COLLET work on stock up to ¾ in. is made possible on small lathes which normally have a capacity of only ½ in., with the Speedichuk and Bren Collet, introduced by *Gen-*

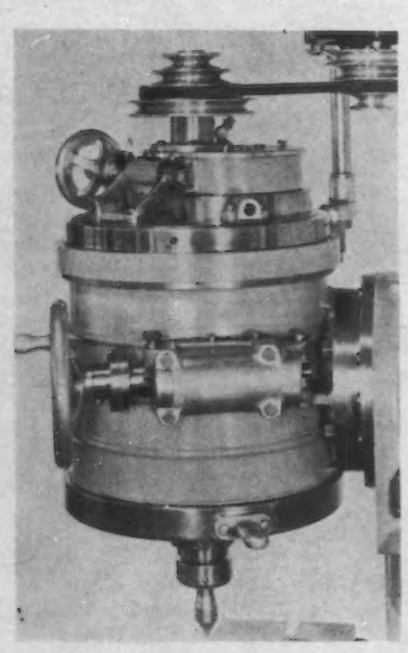
eral Die-Stamping-Tool Co., 265 Canal Street, New York. Adaptable to any lathe with a 1½ in. x 8-thread spindle nose having a No. 3 Morse taper on the inside, it can also be used on any miller or drill press for



accurate chucking work. Quickly fitted to a lathe, Speedichuk requires no adapter plate. A floating closing sleeve compensates for wear and misalinement of lathe spindle, and the 6-in. handwheel assures maximum gripping pressure on collet with minimum effort. The Bren collet is designed to allow use of full capacity through spindle. Closed by squeeze action, it avoids longitudinal movement.

Rotary Milling Attachment

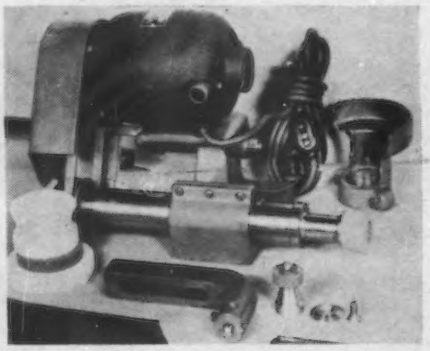
DIE sinking work can be done with the Matthew rotary tool carrier, made by the *Production Machinery Development Co.*, 4845 St. Aubin Avenue, Detroit, for attachment to milling machines. The cutter spindle is mounted in an offset position in a carrier which may be rotated by handwheel (upper) within a larger inner body so as to adjust the eccentricity of the spindle with respect to the axis of the latter. This



body, in turn, is mounted within a stationary housing which is fastened to the machine proper. A second handwheel (lower) and worm and wheel are used to rotate the larger body and thus sweep the spindle in a full circle or fraction thereof. Maximum swing is 7 in. in diameter. Spindle proper is carried in precision ball bearings and is driven by a four-step cone pulley from a ½-hp. motor, not furnished. For straight line cutting, the spindle can be locked on dead center. The head itself can be swung in any position from vertical to horizontal on either side, and can be fitted to any make of horizontal make of milling machine by means of a plate. The company also supplies a hand milling machine with ram on column for the attachment of the Matthews head.

Tool Post Grinder

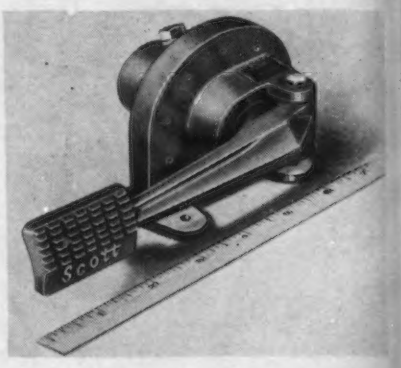
A SMALL heavy-duty grinder for internal, external, face and taper grinding is offered by *Lempco Products, Inc.*, 5700 Dunham Road, Bed-



ford, Ohio, which grinds holes 8½ in. deep and produces fine finishes. Quill is adjustable for two different lengths. The quill assembly is balanced statically and dynamically, with the quill mounted in four preloaded matched sets of ball bearings constantly lubricated in fog oil bath. Two-step V-pulley provides spindle speeds of 6000 to 13,000 r.p.m.; ⅝-hp. motor is heavy duty, high speed, ball bearing, two-pole series wound with built-in blower, for a.c., d.c., 25, 50 or 60 cycles, single phase.

Hydraulic Pressure Generator

DEVELOPED originally for actuating wheel brakes in aircraft, the B-711 hydraulic pressure generator manufactured by *Scott Aviation Corp.*, Lancaster, N. Y., has been industrially applied to motion transmission, jig actuation, etc. The compact design, available in several models with different lever and pedal arrangements, permits a completely



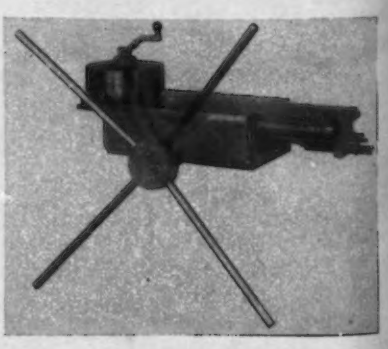
sealed system, eliminating entirely the need for a reservoir of any kind. Pressures up to 500 lb. with a displacement of 0.8 cu. in. can be obtained. It is claimed that life tests of over 100,000 cycles have been run with no evidence of fatigue failure.

Scraper Set

A NEW line of metal working hand scrapers has been put on the market by *Murcott & Campbell*, 582 Union Avenue, Brooklyn. These scrapers are made by forging and grinding from a high carbon steel, specially heat-treated to produce the maximum hardness and grain. The line includes flexible scrapers for fine finishing work, rigid scrapers for heavier work, gage scrapers for use on concave surfaces, edge burring tool, three-edged scrapers for burring holes, four-edged scrapers for flat surfaces and standard bearing scrapers.

Turret Attachment

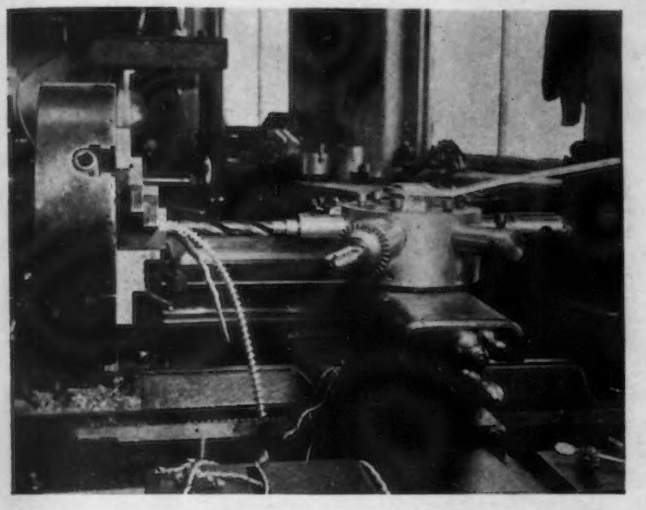
A TURRET attachment that quickly changes an engine lathe into a hand screw machine has recently been placed on the market by *United Industries*, 4 East Buena Vista Avenue, Detroit. Made in a variety of models, it is installed on the ways by simply removing tailstock. The base, which clamps to the lathe bed, is normalized. All gears and racks are fabricated from alloy steels and are of standard design, facilitating replacements. The turret is of the six station type, with automatic stops for each station, the turret



being furnished blank so as to permit perfect alinement in boring on assembly. The device is self-indexing. Feed is by hand.

Tool Post

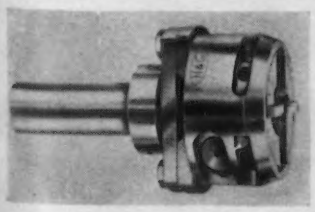
TURNING an ordinary lathe into a turret lathe is the object of a new tool post manufactured by *Marco Co., Inc.*, Wilmington, Del. Built in two sizes to accommodate six or eight tools, the multi-purpose post can be inserted into existing tool post slots.



The post is furnished with set screws for tools, but none of the holes for tools is drilled. These are to be bored and reamed after the tool post is clamped in position on the lathe carriage. One or two taper pins are provided to lock the cross-carriage in a central position, so that the post can be replaced in its proper position if it should be necessary to remove it. It is claimed that the post turns the ordinary lathe into a multiple-purpose machine capable of doing work such as is now done on turret lathes or special machines.

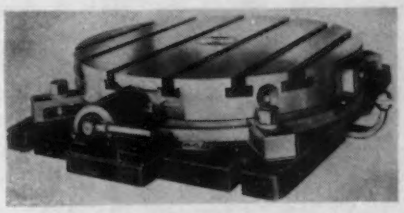
Adjustable Die Heads

A NEW style of solid adjustable die head for use on all sizes of Brown & Sharpe automatic screw machines has been developed by the *Eastern Machine Screw Corp.*, New Haven, Conn. The heads are complete with holders and are provided with an alinement feature to take care of misalinement of turret and spindle. Size ranges correspond to the carrier ranges in the opening die heads. The die heads are extremely light in weight, relatively small in diameter and relatively short. They are adjustable for size, and when once adjusted, are claimed to hold that size.



Revolving Tables

THE revolving tables offered by the *Ohio Machine Tool Co.*, Kenton, Ohio, are available either round or square. They are graduated in ½ deg., and any number of positive index positions can be furnished. T-slots are of sufficient size and number to thoroughly secure jobs direct to the table top, a center depression being provided for locating fixtures. The table top is honed to a very close fit with the large diameter king pin. An anti-friction device raises the table top from its bearing, including the worm throw-out mechanism, by a single motion of a lever, providing easy movement by the hand crank on the worm shaft or when the worm is thrown out of mesh, easy and rapid revolving. The units can be arranged to suit many types of machine tools, in addition to horizontal boring, drilling and milling machines.

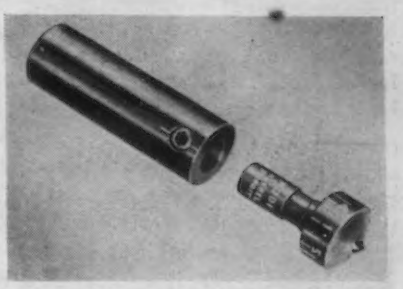


Magnet Block for Wheel Dresser

AN Angle-Set-Magnet-Block for magnetic chuck mounting of a grinding wheel dresser is announced by the *Diamond Tool Co.*, 943 East 41 Street, Chicago. This is a further development of the Angle-Set diamond tool, to adapt it in combination with the Magnet-Block for accurate dressing of surface grinders. Designed for wheels up to 8 in. in diameter, it is stated that larger diamonds can be set in it for larger wheels. The Magnet-Block contains a 12-deg. Angle-Set fitted with a 1¼ carat diamond, and is equipped with two lock screws.

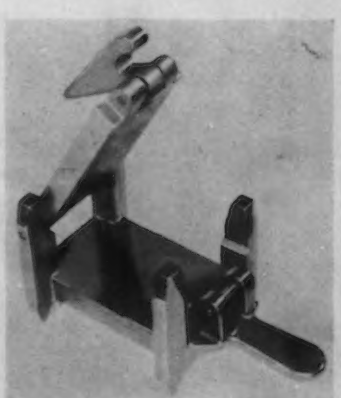
Dressing Tool

THE Koebel Diamond Tool Co., 9456 Grinnell, Detroit, offers the "Kodi" diamond dressing tool that fits most standard grinding machines. A special shank or adaptor, fitted with a recessed head set screw which locks the nib in position, is permanently attached to the machine, and only the nib is removed for re-setting or replacement. Graduations are placed in a developed sequence. Longer wheel life and greater grinding efficiency are said to result from the fact that diamonds turned frequently insure constant sharp points.



Drill Jig Unit

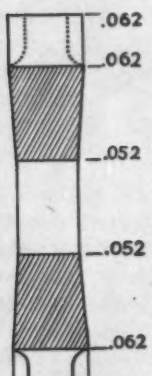
A NEW type basic drill jig unit known as the Parlec Universal Drill jig is offered by *Earl C. Parkhurst*, 751 East Stepney Place, Inglewood, Cal. Sturdily constructed



of cast nickle iron and normalized, with top, bottom and both sides of jig frame and cover finished, it is only necessary to finish the base for location of part to be drilled, add side plates if drilling sides, and add bushing and clamping to make the jig ready for production. With only three castings and four pins, and a special quick opening and locking device, its design is simple. The locking device also acts as a handle during drilling. It is made in seven standard sizes, with special sizes and heights available.

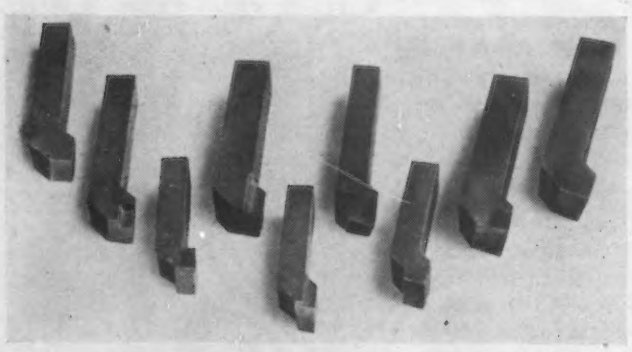
High Speed Steel Metal Saw

E. C. ATKINS & CO., 402 South Illinois Street, Indianapolis, Ind., has designed a new high speed steel saw which enables highly accurate slotting and cutting off to be done in milling machines. These new saws are made 0.062 in. thick on tooth edge and 0.052 in. at mandrel. Each tooth has a relief clearance ground at the back to the depth of the gullet, which allows for sufficient clearance where tolerances as close as 0.0002 in. must be maintained. They were designed originally for slotting supercharger wheels, but are finding their place on many other kindred operations where accuracy is a first requirement. Saws are made in 3, 4, 5, 6 and 8 in. diameters, for most standard milling machine arbors.



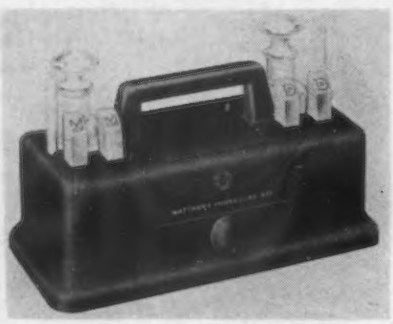
Meehanite Tool Shanks

THE Victory tool shanks and forming tools made by the *Cooper-Bessemer Corp.*, Mount Vernon, Ohio, contain no critical material and are therefore immediately available. They are cast to shape with Meehanite and specially shaped shanks can be made from sketches. An illustrated booklet giving specifications and series numbers, dimensions and quantity prices for both straight and bevel-nosed tools is offered by the company.



Inspector's Kit

A COMPACT inspector's kit has been developed by *Jas. H. Matthews & Co.*, 3942 Forbes Street, Pittsburgh, to be used in connection with their "S-22" synthetic stamps and acid etching inks. The kit is made of acid proof, non-critical material, and holds four stamps. Acid etching ink is kept in one bottle, oil or neutralizer in the other, with a stamp pad in the drawer shown at the front of the unit. In the marking operation, the inspector chooses the desired stamp, tilts the self-closing cover on top of the kit, and inks the stamp by touching the pad underneath. After stamp is inked and withdrawn, the cover closes automatically and does not allow acid fumes, which might affect precision parts, to escape. After the part has been marked by inspector, he places a drop of oil or neutralizer on the marked impression, thus neutralizing the acid.



Cutting Oils

SEVERAL types of cutting oils have been put on the market by the *National Oil Products Co.*, Harrison, N. J. A surface active synthetic increases the oiliness and wetting characteristics of Vegicut A, insuring maximum lubrication and heat transfer at the lip of the tool. The fatty acid is derived from vegetable sources and is said to be more stable and resistant to rancidity and oxidation than fats of animal origin, such as lard oil. Vegicut B is similar to Vegicut A, but the viscosity, flash and fire points are lower, with less free fatty acid. Vegisulph is a medium viscosity blend of a mineral oil, a sulphurized fatty acid and a surface active synthetic. An ample percentage of active sulphur at operating temperatures and pressures provides maximum anti-welding properties. Vegisol is an emulsifying cutting oil, which is specially treated to render it emulsifiable in hard waters. In general, emulsions of one part Vegisol and from 6 to 9 parts water are used for machining alloy and high carbon steels.

Marking Machine

A NEW power driven marking machine has been added to the line made by *Acromark Co.*, 341 Morrell Street, Elizabeth, N. J., which is designated as the Acromark 9AM model. The power addition is so constructed that it can be added to the standard hand machines by removal of the hand lever and by attachment of the driving arm. Driving power is furnished by a ¾-hp. a.c. gear reduction motor mounted to the left side of the marking machine. The gear reduction is selected for normal marking speeds of 9, 18 or 36 strokes per min., and if an operator is fast, one part can be marked at each forward and at each backward stroke.

Curved Line Stamping

A NEW line of ring style holders, designed for curved line marking of parts from ¼ to 6 in. in diameter, has been introduced by *Jas. H. Matthews & Co.*, 3942 Forbes Street, Pittsburgh. The holder can be used with segment type, which is engraved with one character only, or logo dies, engraved with two or more characters, from 1/32 to ½ in. in size. These holders are recommended for marking rounds, dials, bearings, tubing rims and special parts, whether the surface is recessed, concave or convex. Type is available in letters, figures, or symbol designs.

Throw a needle through a Haystack?

s pipe testing machine
ar Fluid Power answered
cult design problems.

OILGEAR

Oilgear Fluid Power has solved more difficult problems

T may sound foolish to talk about throwing a needle through anything . . but Oilgear Fluid Power furnished st the right answer to *that* problem the design of wire-braiding machines. lgear provided a mechanism that uld rapidly reciprocate the necessary achine part without it tearing everying to pieces as previous constructons had always done.

Your machine design problem may quite different. You may want steply variable speed control of some nction . . . or a simple means of apying great pressure . . . or a way of nchronizing a group of motions . . . or perfect sequence or cycle operation . . . or any one of dozens of Oilgear answers to problems that appear virtually impossible—*until you know Oilgear Fluid Power.*

For a quarter century Oilgear engineers have worked with executives and designers of hundreds of companies building machines and mechanisms of widely diversified use. The combination of Oilgear experience and know-how with the remarkable possibilities inherent in Oilgear Fluid Power equipment may be the very answer to *your* long-sought perfected machine. *Now* is the time to find out. The Oilgear Company, 1303 W. Bruce Street, Milwaukee, Wisconsin.

ARE YOU TRYING TO:

1. Apply large forces through long . . . or short . . . strokes at variable speeds?
2. Obtain automatic work cycles, variable speeds in either direction . . . with or without pre-set time dwell?
3. Apply large forces through continuous or intermittent reciprocating cycles at constant or variable velocities?
4. Obtain extremely accurate control of either position or speed of a reciprocating member?
5. Apply accurately variable pressure either static or in motion?
6. Closely synchronize various motions, operations or functions?
7. Apply light . . . or heavy . . . forces at extremely high velocities through either long or short distances of travel?
8. Obtain continuous automatic reversing drives at constant R P M or over a wide range of speed variation?
9. Obtain accurate remote control of speed and direction of rotation, rates of acceleration and/or deceleration?
10. Obtain constant horsepower output through all or part of a speed range?
11. Obtain automatic torque control?
12. Obtain accurately matched speed of various rotating elements?
13. Obtain constant speed output from a variable speed input?
14. Obtain full pre-set automatic control, elimination of problems of shock, vibration, etc.?

You Need Oilgear!

OILGEAR

Fluid Power

Assembly Line . . . STANLEY H. BRAMS

• Saginaw magnesium foundry techniques worth study . . . Ford eliminating kirksite at Willow Run . . . Thirteen bus makers get civilian quotas for 1944 output.

SAGINAW—For a long time after the logging industry dwindled and died in Michigan, Saginaw, a southern terminus point for timber, mouldered and languished. In recent years it has become a constantly more important center for the manufacture of General Motors products, and the war period has brought it to a pitch of intense activity. Developing new things, plant executives in Saginaw have taken interesting new approaches to the problems, and they have worked out some very worthwhile techniques.

The new magnesium foundry operating in the grey iron foundry of the Chevrolet Division at Saginaw is an operation well worth study. Output which began in December is at substantial volume level, with higher rates in the offing.

The automotive assembly line technique is most interestingly applied in the assembly of cores for a rear crankcase section for aircraft. There is a total of 28 cores involved in this complicated casting, all of which must be set in under extremely close tolerance. The cores are built up on a moving assembly line manned by eight people, mostly women, working in pairs. The core pieces are brought to this line in racks, assembled in fixed order; and when the assembly is completed, it is gaged much like finished metal, utilizing a fixed gage including 15 locators.

Steel screens customarily are used in magnesium foundries for sifting the metal, but this plant has adopted instead the use of sand strainer cores. These sections are about a quarter inch thick and are screened with ⅛-in. holes. The use of these screen cores is notable through many of the operations.

Magnesium foundry technique in freeing the casting from the sand core usually employs an air chisel followed by an air blast. This technique raises the possibility that the chisel, in careless hands, will chip into the casting itself and ruin it.

In place of such treatment the Chevrolet foundry employs a heavy vibrator operated by one man, requiring a cycle of from two to three minutes per casting. Castings, regardless of their complication, come off this shaker thoroughly cleaned out.

On the other side of Saginaw is the Chevrolet Forge Plant, DPC-owned, which houses an impressive array of forging equipment, including four 35,000-lb. steam hammers. Interesting in this exhibit of heavy machinery is a 3000-ton hydraulic press used to cog down 1500-lb. aluminum ingots.

The ingots come to this plant 12-in. square, in lengths from six to nine ft. The hydraulic press reduces the one-foot dimensions down to a 9-in. square.

The aluminum ingots are heated in a nearby furnace to 720 deg. F. temperature. A manipulator removes these ingots after a 4-hr. period in which they are brought to temperature, and feeds them to the press.

The press is capable of exerting six million pounds pressure, by means of a water soluble oil mixture pumped under a pressure of 4500 lbs. per sq. in. against the top of the ram cylinder. An accumulator system of four air bottles and one "air-over-water" bottle is used to store pressure for the press stroke. The bottles, built of 6¼ in. welded laminated steel plates, weigh 32 tons apiece.

Not only does this treatment bring the aluminum ingots down to size required for forming operations, but it also raises the tensile strength of the metal from 38,000 to 55,000 lbs. per sq. in.

AS an observer travels through outstate Michigan, the impact of the enlarged aircraft production program is at hand in all directions. Numbers of the machine shops of the state, small and large, are identified with the fabrication of aircraft engine parts. In such shops much added equipment is on order and is being installed, rapidly completing preparations to enlarge unit output as much as double or triple the going rate of the past winter.

New equipment for this enlarged operation is coming in on schedule. The one tight place in the picture, if any really exists, seems to be in Pratt and Whitney gear grinding machines, which are in large current demand because of the augmented aircraft procurement.

As for materials, aluminum continues to be on a hand-to-mouth basis but the extreme worry of last Fall has definitely alleviated. There is continuing worry over the Controlled Materials Plan, and some persons' viewpoint is that it is working no better than it did during the latter stages of the first quarter. All the same, the essentials for production are arriving in time; materials shutdowns are rare.

Many of these out-state plants are already getting back their CMP applications for fourth-quarter production requirements. Cold rolled and cast steel applications are being reduced; allotments for other materials are coming through in about the same volume as requested in applications.

WHEN Willow Run began to tool for production, aircraft manufacturers looked askance at its use of hard steel dies, feeling that if kirksite was not used the facilities would lack sufficient flexibility for a plane manufacturing program. Ford's immense tooling facilities at River Rouge, however, have made it possible to surmount the pitfalls which the aircraft makers anticipated for Ford. In fact, right now the use of kirksite dies at Willow Run is being cut off rapidly in favor of steel dies for every press requirement.

The use of kirksite at Willow Run was rather unique at all times. It was used only in blanking dies, and instead of being cast in a solid mold, the kirksite was used in sheets of 3/16-in. thickness, which were riveted to a machine steel base. As the edge of the die wore under use, it was peened back into shape. When a section of the die broke off, it was a comparatively simple matter to tear off the kirksite lining and rivet on another sheet.

Despite these advantages, Willow Run did not find kirksite to its liking. The experience was that when aluminum of heavier thickness than .035

The KELLER that cut capers

A Short Story from P&W's Files

TIRED from a twelve-hour tussle with a tough problem in one of our customer's plants, a Pratt & Whitney field service man arrived at his hotel and found another call for help from a plant 300 miles away. Keller Machine trouble . . . something wacky with the controls. Our man wearily boarded a train and reported the next morning.

Yes, there it was, the Keller that cut capers. It had been running perfectly for a year in the hands of one operator, but since a second shift was put on, there had been difficulties. Our man opened the control box, found two relays out of adjustment, and fixed them. But just on a hunch, he waited around until the second-shift man arrived in mid-afternoon.

The Keller, you know, is an interesting machine. You make up exactly the shape you want out of plaster or wood or whatever is easiest. A tracer on the machine "feels" out this master shape, and controls a cutter down below working in tough die steel. It carves out complex two or three dimensional shapes with ease . . . to very close tolerances. Controlling the operation is a set of electrical relays . . . a fascinating study for anybody with an inquisitive nature.

The second-shift operator turned out to be just that kind . . . a bright young man, earnestly trying to get ahead, but without much knowledge of electricity. Yes, he admitted shamefacedly, he'd been tampering with the works . . . "re-adjusting the relays" . . . playing with it.

Our man gave the boy a brief lecture on the need for letting well enough alone . . . suggested to the superintendent that the boy be required to study the instruction book. It was done.

That was eighteen months ago. Latest word is, "The Keller has been running smooth as silk . . . control box locked up . . . has had no attention except periodic dust removal."

* * *

Most of the small amount of Keller trouble we've had boils down to that . . . well-meant tampering by inexpert hands. The solution is as simple as that . . . keep them away from it. There's nothing delicate about the Keller . . . run it the way the instruction book says, and you'll get plenty of production with no regrets.

PRATT & WHITNEY
Division Niles-Bement-Pond Company
West Hartford, Connecticut.

PRATT & WHITNEY

MACHINE TOOLS ★ SMALL TOOLS ★ GAGES

WEST HARTFORD CONNECTICUT

Basic Accuracy For Mass Production

in. was put in the dies, the kirksite had a very short life. Also, utilized as it was, occasional rivet loosening occurred and necessitated repairs.

Had Willow Run production been in small quantities, it was probable that kirksite would have been continued and used much more widely than it was. But volume production, now being reached at Willow Run, made permanent dies more desirable, in the opinion of the management. As a result, plow steel is being employed more and more as a die medium for work on aluminum. Also being utilized are dies of flame-hardened 4130 and 8630 steel.

Still another interesting development in the press department at Willow Run is the increasing use of armor plate steel for dies. This material consists of salvage from the Ford steel foundry, and hence does not detract from the armor plate supply used for military requirements.

CLOSE on the heels of permission for medium and heavy truck manufacturers to resume limited civilian goods output this fall (Assembly Line, May 27, 1943), the WPB now has authorized bus manufacturers to undertake output during 1944. The pressing needs of civilian transportation influenced the WPB to authorize output of 7300 integral units, divided among 13 manufacturers. In addition, the transit industry will produce 11,000 bus bodies, 400 large trailer buses, 1200 small trailer buses, 3200 sedan conversions, and 300 Presidents' Conference Committee type street cars during next year.

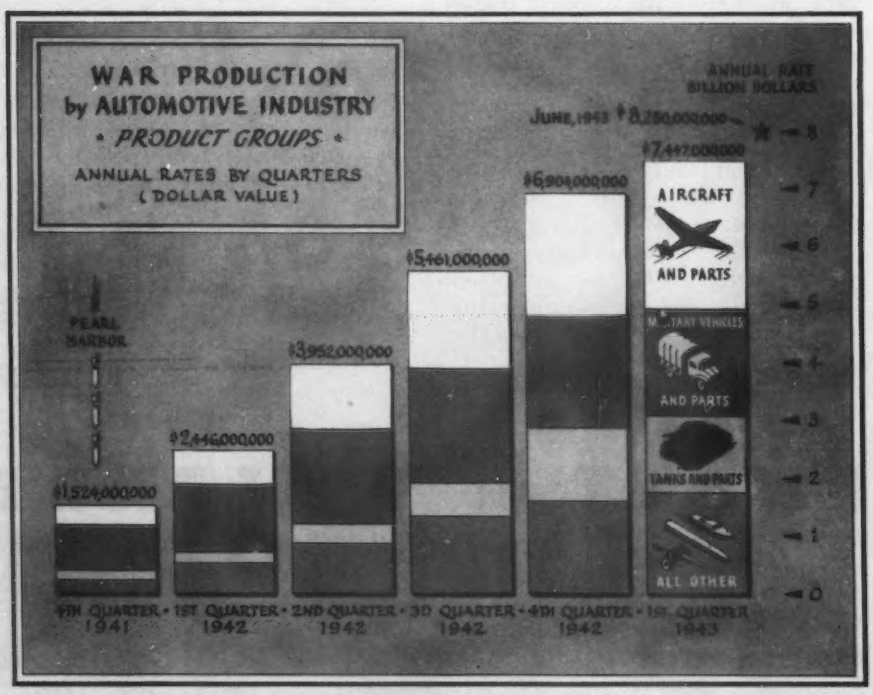
Exact figures are not finalized as yet, but this is the breakdown of manufacturers authorized to go into production, along with their basic allotments by quarters during 1944: Beaver Metropolitan Coaches, 50; D. C. Beck and Co., 50; Crown Body and Coach Corp., 15; Fitzjohn Coach Corp., 50; Ford Motor Co., 400; General American Aerocoach Co., 100; General Motors Truck and Coach, 500; Kalamazoo Coaches, 35; Kenworth Motor Truck Corp., 10; Mack Mfg. Co., 300; Reo Motors, Inc., 100; Superior Coach Corp., 100; White Motor Co., 200. General Motors Truck and Mack will not produce in the first quarter, and there are other minor variances in the list by quarters.

At the same time, Washington is deliberating a 1944 trailer production program for civilian requirements. Last May the Office of Defense Transportation said that 16,000 units would be necessary in this category, but after inquiry, the WPB appears inclined to raise this total to a neighborhood of around 24,000 units.

Of the 7300 buses tentatively programmed, about three-fourths of them will be for city transportation; the balance will be used in inter-city runs.

One question of high interest which has not yet been settled in regard to both bus and truck output concerns the prices to be placed upon them. Actually such output will come under the ceilings imposed by OPA during the past few years. As a practical matter, of course, wages and other costs have risen substantially since these ceilings were established, and manufacturers maintain therefore that they are unable to sell under the old price limitations in nearly all instances. It appears likely that Washington may modify its ceiling prices on these vehicles so that increased manufacturing costs now involved can be taken into account.

Meanwhile, there are some very definite indications that the medium and heavy truck output already authorized for civilian uses may be somewhat extended. WPB, the Army, and individual manufacturers are studying the forthcoming military needs to be produced by the various truck companies, and are analyzing these generally diminishing requirements in the light of production facilities and available material. There is little question of the need for more civilian trucks. There is an increasing impression that facilities to produce them will become continually more available as truck plants go farther beyond military requirement peaks. It would appear, therefore, that materials available later will be the determining factors in extensions of manufacturing quotas for medium and heavier trucks, and for output of lighter jobs as well.



Automotive Council for War Production, Information Division

WPB to Enforce Scrap Segregation

Washington

• • • **WPB took action** on Tuesday to enforce M-24-c, which requires the segregation of alloy scrap. Declaring that many producers, dealers and steel mills have failed to obey the order, WPB announced that all compliance powers will be used to enforce the order, which was reissued with revised categories covering recently-developed alloy steels and irons. Steel Division officials said that the country's stocks of virgin alloying metals are being rapidly depleted and that a considerable tonnage of valuable alloys which could supplement new supplies is being dissipated because of improper segregation and identification of scrap.

The revised M-24-c specifically prohibits the use of any type of scrap listed in the melting of any but alloy steel or iron.

How to reduce PRODUCTION INTERRUPTIONS caused by tools

Many busy war plants have found the answer to the problem of getting more production per machine by using the Carpenter Matched Set Method of tool steel selection. Because it provides a definite *system* for selecting the one steel that is best for each tool, this method helps to get tools that give longer *uninterrupted* production. Thousands of successful applications have proved that the Matched Set Method definitely helps to get more productive time from machines and tools.

Below are two actual production line examples of how the Carpenter Matched Set Method has helped others get increased output from present equipment.

If you are anxious to get better tool performance in *your* plant, the Carpenter Matched Set Method can help you. The two books below can help put it to work in your plant.

WANTED:— HIGHER PRODUCTION

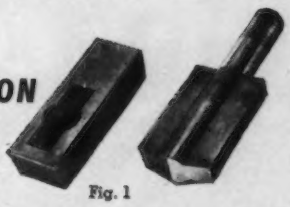


Fig. 1

JOB: Punching 3/16" thick O.H. steel sheets—19 punches and dies (Fig. 1) to the set-up. As this was a very *tough* job, the steel first tried was Carpenter's R.D.S. (Oil-Tough), toughest of the Oil-Hardening Matched Set. This gave 190,000 holes between grinds.

PROBLEM: To step up production per grind—so as to cut down shut-down time required for regrinding.

SOLUTION: Reference to the Matched Set Method indicated that greater wearing qualities could be obtained by moving north from R.D.S. to STENTOR (Oil-Hard).

RESULT: Punches and dies made from Stentor stepped up production *over 100%*—to 387,000 holes per grind. And here is an important point—while Stentor was chosen for its greater *hardness*, it also proved to have sufficient *toughness* to handle the job.

TWO JUMPS TO FIND THE ANSWER

Fig. 2

JOB: Making 3" diameter rolls used for rolling a bead on stainless strip .008" thick. Note the thin edge on the bead.

PROBLEM: When made of carbon tool steel, the thin bead cracked in hardening, so the Matched Set Method was followed to STENTOR (Oil-Hard) for "greater hardening safety." When made of Stentor, the bead stayed on in hardening safe enough, but when placed in service the strain was too much for the thin section in this hard steel, and the edges chipped.

SOLUTION: Referring again to the Matched Set Method indicated that moving south to R.D.S. (Oil-Tough) would provide greater *toughness.*

RESULT: Made of R.D.S., the rolls shown in Fig. 2 had turned out "miles" of molding when this picture was taken—and the bead is still there!

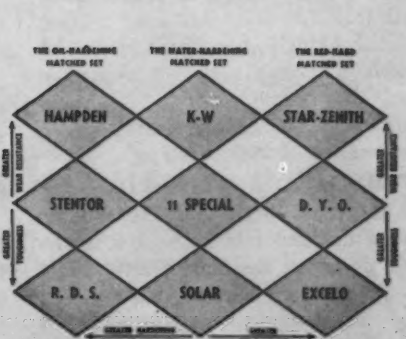
For "Refreshing" Skilled Tool Makers and Training New Men. More than 35,500 copies of this text book are now in use. Copies are available to tool steel users in the U.S.A. *at cost,* $1.00—$3.50 elsewhere.

For Tool Room Foremen and Tool Hardening. A 167-page manual with a comprehensive explanation of the Matched Set Method of Tool Steel Selection, detailed heat treating data, hardening instructions. *Free* to tool steel users in the U. S. A.

The Carpenter Steel Company 121 BERN ST., READING, PA.

Carpenter MATCHED TOOL STEELS

IMPORTANT BEFORE... **VITAL NOW**



Washington . . .

L. W. MOFFETT

• Smith-Connally anti-strike law raises question of whether U. S. can maintain representative constitutional government . . . Rep. How-Smith says new law forbids WLB to order maintenance of membership clauses in future agreements.

WASHINGTON — The effect of the Smith-Connally anti-strike law is to raise the question of whether this country can maintain representative constitutional government. The courts will have to decide whether the elected representatives of the people shall govern or whether the War Labor Board and the petted rulers of organized labor shall make the laws of this country.

This became apparent last week when Representative Howard Smith, Democrat of Virginia, said that the new law forbids WLB from ordering maintenance of membership clauses in future collective bargaining agreements. When WLB members were asked their opinion, they said that they did not intend to change their past practices in this respect.

The anti-strike law says that WLB shall make decisions to be governed by the National Labor Relations Act, among other laws. Representative Smith told THE IRON AGE that Section 8 of the NLRB Act which makes it possible for employees to secure a closed shop provided it is voluntary would prohibit government ordered maintenance of membership.

WLB Chairman William H. Davis said it would be a departure from judicial demeanor if he said what he would do about the matter and stated that he would disclose his opinion when a case involving maintenance of membership arises. Not so reticent was Public Member Dean Wayne L. Morse, who is on loan from the University of Oregon law school.

DEAN MORSE said that he intended to vote maintenance of membership clauses whenever he thought them necessary. Also, he declared that it was his belief that a board decision embodying such a clause would be sustained by the courts as constitutional. Dean Morse said modestly that the constitutionality of the government ordering persons wo do not genuinely consent to enter into contracts had been settled by his opinion in the little steel case.

Dean Morse's opinion is based on the belief that the President has unlimited powers during war. The Constitution does not say this, nor are there any Supreme Court decisions directly in point. Sharply differing with the idea of unlimited powers, Representative Smith says that not even Congress has the authority to order the closed shop of maintenance of membership. Representative Smith maintains that the Constitution gives the federal government no such authority over private contracts.

WLB rests its authority to order maintenance of membership clauses on a memorandum in response to a question put to NLRB at the President's request. NLRB was asked whether it thought maintenance of membership clauses were legal under the Wagner or National Labor Relations Act. Its interpretation was solicited because the executive order establishing WLB made WLB's decisions subject to the Wagner Act. NLRB replied that maintenance of membership clauses were legal. However, it should be remembered that under NLRB's law such agreements are supposed to be voluntary.

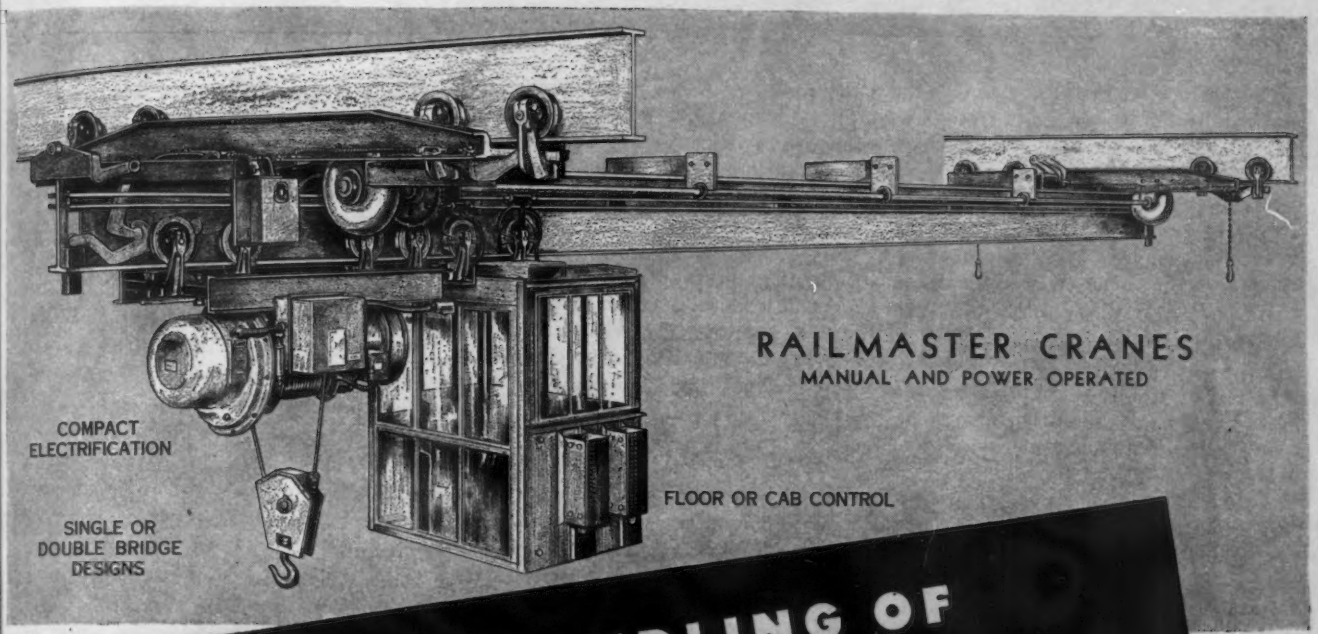
AN NLRB attorney told THE IRON AGE that WLB did not ask if the ordering of maintenance of membership clauses was legal. The lawyer said that he did not think that WLB had authority to order any person to enter into any kind of a contract constitutionally even though the recently enacted anti-strike law expressly confers this power on WLB.

Dean Morse is not alone in his determination to spread the doubtful benefits of the closed shop. Other board members indicated that they think such orders proper and that they will continue to do this until they receive direct orders not to either from the courts or Congress. Frank P. Graham, president of the University of North Carolina, another public member, speciously pointed out that Representative Smith's amendment to directly forbid WLB the exercise of this power was defeated before the House passed the bill. Though this is true, Congress did make WLB's decisions subject to the Wagner Act which makes the closed shop a voluntary proposition. Industry members said that they thought, too, that WLB would continue to order maintenance of membership.

THOUGH WLB has asked the Attorney General for his interpretation of the provision which says that no member of the board shall be permitted to participate in any decision in which the member has a direct interest as an officer, employee, or representative to either party to the dispute, Chairman Davis thinks a "liberal interpretation" should be applied. Chairman Davis said that union members of the board should be permitted to vote in a decision affecting a portion of their own national organization. He saw no harm in an officer of AFL, for instance, participating in a decision affecting the AFL Machinists' Union, or the Carpenters' Union or any local thereof. Such a case would not involve such direct interest as to disqualify the board member, according to Mr. Davis.

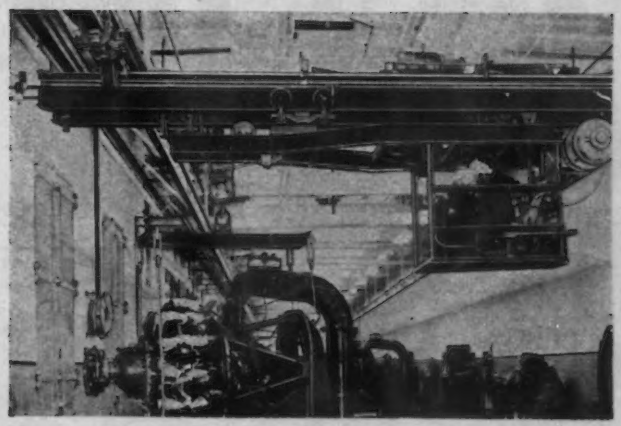
Mr. Davis saw no more harm in the foregoing example of voting than if a member who was an officer of the United States Rubber Co. should vote in a case affecting the United States Steel Corp. He said that the United States Rubber Co. member would much more likely favor another business concern than an AFL officer-member would favor the cause of a union subsidiary. Mr. Davis said that if the case were otherwise the tripartite character of the board would have to be destroyed because either one of the two major union groups would have to disqualify themselves.

MR. DAVIS called the 30-day strike notice provision of the anti-strike law a "disturbing influence" in connection with the settlement of employee grievances, the point on which the President based his veto of the measure. A little later Mr. Davis said that he was going to



FLEXIBLE HANDLING OF *Massive Production*

B-28 Bomber Makes Maiden Flight on RailMaster Crane.



Spotting motors with telescoping crane.

MASSIVE loads set up no problem when American MonoRail RailMaster Cranes are on the job. They are not limited to bridging a single span but, with their special interlocking and twin bridge designs, they can cover any area with any type of handling equipment.

American MonoRail Systems, too, are adaptable to many handling problems, offering versatile application without lengthy engineering or costly adjustment. Let an American MonoRail Engineer explain the advantages of overhead handling without any obligation to you.

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do everything in his power to enforce the provisions of the anti-strike law. These two statements seem to conflict. The sincerity of the board may soon be tested by proof of the truth or falsity of rumors to the effect that the board is depending upon favorable decisions on questions to be interpreted by the Attorney General to nullify the anti-strike law.

The WLB is not by itself in its resentful attitude toward the anti-strike law. Leaders of organized labor have called the law dangerous and have predicted the defeat of 75 per cent of the members of Congress who voted to override the President's veto. But the trouble is that those interested in preserving the rights of labor do not seem to have grasped the significance in the passage of the anti-strike law.

THE overriding of the President's veto should not be interpreted as the action of legislators who are anti-labor. It should be interpreted as a rebuke to labor and to the executive portion of government for their unwillingness to clean up labor's house.

The coal strike, with the attendant slowing of war plants and other strikes whether approved by national union officials or not, have exhausted the patience of the American people. Those who would do violence to the law are inviting further Congressional intervention. And if the law is not administered in the spirit in which it was written more drastic legislation will be enacted.

Further intervention would take the form of general regulation of unions, but members of Congress are generally opposed to doing this. Representative Smith does not favor "hamstringing" labor nor any further legislation for the duration provided labor does not indulge in any activity to hold up the war. Indeed, the fear by some labor sympathizers that Congress, once having tasted blood, will act unrestrainedly to over-regulate labor unions is thought groundless by a number of representatives and senators. What the country wants is moderation in labor's demands and support of constitutional government.

American industry must decide to take advantage of the anti-strike law if WLB breaches it. But if industry is as timid about asserting its rights by going to court for a determination of these rights as it has been in the past, it is as guilty of letting down constitutional government as any labor leader or bureaucrat.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

IT'S TH' FIRST TIME IN THIRTY YEARS IN A SHOP HE'S BEEN ABLE TO ENJOY HIS FAVORITE BAD HABIT WITHOUT TH' CUSTOMARY SWARM OF BUMS--HE SEZ HE LIKES TH' LADIES IN TH' SHOP!
HE'D BETTER BE CAREFUL! THEY'VE GOT THE VOTE, TH' PANTS, THE JOBS --BUT I THINK THAT ONE WILL STUMP 'EM, THOUGH!
J.R.WILLIAMS
ALONE IN A CROWD
T. M. REG. U. S. PAT. OFF.
COPR. 1943 BY NEA SERVICE, INC.
7-9

New Report Covers Methods To Improve Blast Furnace Coke

• • • **The Bureau** of Mines has published a report outlining possible methods for improving the quality and uniformity of blast furnace coke.

Points of attack were suggested for the following five major problems limiting iron production: The limited availability of preferred coking coals; high and increasing ash and sulphur content of coal as mined in many fields; difficulties in obtaining new equipment, repairs, and replacements; non-uniformity of coke; and poor and variable quality of some beehive coal. The increase in coke ash content in the first 10 months of 1942 cost the Nation production equal to that of two large blast furnaces, or more than one-half million tons of pig iron. This undesirable trend in the quality of coke may become intolerable unless measures are taken to conserve for metallurgical purposes coking coals now being depleted by domestic furnaces and commercial boilers, to impose more effective penalties for mining "dirty" coal, to install more mechanical cleaning plants, and to load separately coal for metallurgical purposes.

Among outstanding operating practices of the more efficient plants described in the report were careful control of coal crushing, control of coal bulk density by addition of oil or water, careful timing of discharge from the lorry car, increased use of coal of low volatile content, automatic quenching, scalping and crushing of oversize coke, and efficient screening of the coke with separate charging of nut size coke to the blast furnace.

A copy of the publication, Report of Investigation 3711, "Increased Pig Iron Output Through Improved Coke," may be obtained from the Bureau of Mines, Department of the Interior, Washington.

Thomas Named Director Of Coal Mine Production

• • • **Secretary of the Interior** Harold L. Ickes last week announced the appointment of Thomas J. Thomas, of Chicago, chairman of the Executive Committee of the Valier Coal Co., as Director of Production in the Office up to supervise coal mines in federal of Mine Operations. The office was set custody.

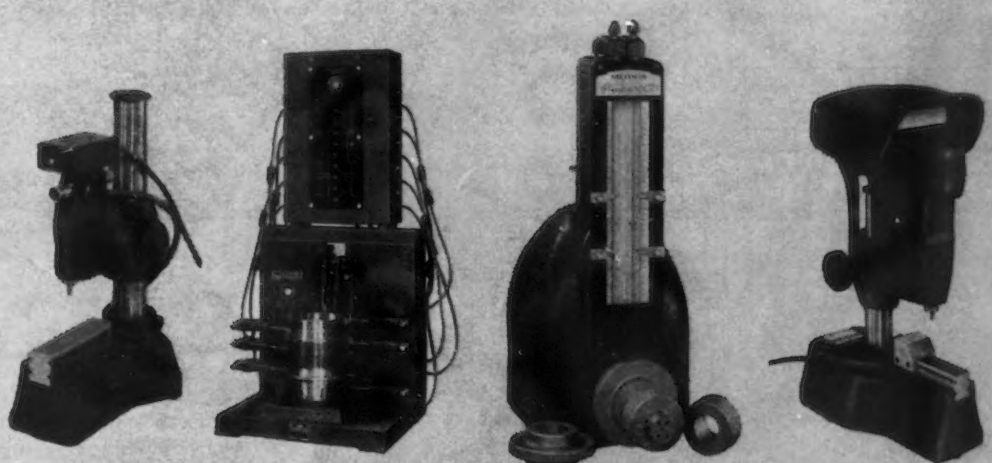
"To err is human" ...and costly!

Inexperience, ineptness, fatigue, ill-health, inattention, indifference—all are possible bugaboos when using fixed gages on extremely close tolerance work (i. e., checking to "tenths").

Scrap, wasted time, production slow-downs, faulty products—these are the high costs of rejecting good parts or passing incorrect parts as being good.

"Hangovers"—physical or mental—make no difference when using a Visual Gage, Multichek, Precisionaire, Electrichek or other Sheffield precision gaging instrument. Mechanical skill built into these gages eliminates the need for "top performance" individual skill to precisely and accurately inspect parts to "tenths".

Sheffield precision gaging equipment eliminates "human" error. Write for new Folder No. 43-1 and name of Sheffield Engineering Representative in your vicinity.



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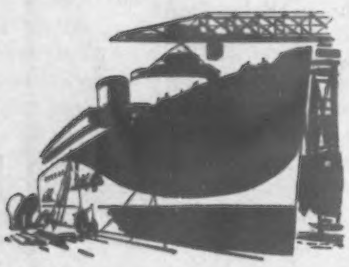
THE SHEFFIELD CORPORATION

DAYTON, OHIO, U. S. A.

SHEFFIELD MASTER GAGEMAKERS

WEST COAST . . . OSGOOD MURDOCK

• Magnesium labor cauldron boils in Nevada desert heat . . . Lockheed puts P-38 on moving assembly line . . . Cast iron pipe industry forms basis of post war speculation.



LOS ANGELES—If you think the Athletic Club steam room in July is the hottest spot in the country, you ought to try Las Vegas, in the southern tip of Nevada, sometime this Summer. You won't sweat as much in Vegas, because the heat is dry, desert air, but you will have other attractions such as wide open gambling and bourbonless bars, interspersed in equal proportions, and women completely tarnished except for the gleam in their eyes.

A photo of a new West Coast blast furnace appears on page 106.

The mystery is not that there is a labor problem in this desert boom town sired by Boulder Dam, but that anyone at all can be found to work there, what with the lack of air cooling in half the government cracker-box housing. A labor problem there is, hot like the weather, constantly boiling, and ready to blow the lid at any moment, crippling production at Uncle Sam's fair haired colossus of magnesium production, Basic Magnesium, Inc.

During the period when the big plant was under construction, some 12,000 or 13,000 workers descended upon the bewildered desert town, barely recovered from the sudden fame descended upon its doorstep by the construction of Boulder, née Hoover, Dam. Some of the BMI construction workers were hangovers from the dam construction days who hadn't had enough energy to get out of the place, some were of the booming breed of the west's openest town, some were drained from the still less attractive mining camps, and still others were migrants from the Middle West originally labeled "California or Bust," who had busted at Vegas. No one was busted long, though, for wages were high, in the best construction camp tradition. As construction tapered off early this year, many of the workers switched their time cards from the construction companies to the Basic Magnesium clock itself, which by this time was wound by Anaconda instead of the Howard Eels' interests.

The old-time construction workers, turned factory hands, had lineal allegiance through the construction trade to the AFL, while CIO's blood flowed in the veins of those who had come from the mines and smelters. By the time the National Labor Relations Board got around to holding an election, tempers were hot. CIO carried the poll by eight votes out of about 2000. With its peculiar talent for starting disputes rather than ending them, the NLRB ruled that employees of the semi-monthly payroll could not vote, even though they held the union card. Insofar as the AFL is concerned, the CIO eight vote victory means nothing at all. A protest has been registered, and the general AFL temper seems to be that if it is not heeded, members will walk off the job, leave for the California seashore, and let the Anaconda management work out with the NLRB the problem of attempting to inveigle a new crew into the desert in mid-Summer.

Every responsible government official charged with keeping the situation under control has been having alternate chills and fever, and military representatives have been expounding with zeal the importance of unbroken magnesium production, while holding the big stick of selective service in the background.

GENERALLY speaking, Pacific Coast employers have an advantage over those in other parts of the country in that they are dealing with union leaders, both CIO and AFL, who are better than average in ability and definitely superior in their control over the actions of their membership. Consequently, production has not suffered in this area as a result of the unrest of organized labor to any great extent. This factor is balanced off, however, by the great gaps between wage scales in shipbuilding and those of other vital industries. The lesser workers in the lesser paid industries naturally are restive under their wage inferiority, and a wage decision favoring the United Mine Workers might easily change the entire equal complexion, setting off major trouble in the aircraft, lumber, mining and smelting industries.

Despite their industry-wide superiority, AFL metals trade workers, labor participants in the Coastwide shipbuilding wage agreement, will probably attempt to squeeze out a little higher scale in pending negotiations. They correctly maintain that the terms of their agreement, signed two years ago, tying their wages to a cost of living index, provide for a raise at this time. Knowing when they are well off, they probably would settle condescendingly for 5c. per hr. additional. Shipyard union leaders maintain that housing and living conditions at most West Coast shipyards are comparable to construction camps and that a higher wage scale is justified. The argument is not an easy one for the unions to defend, for all Coast industrial workers are in the same boat as to living conditions.

AT Seattle, Boeing Aircraft suspended 159 skilled workers in its tool and die shops last week for three days for refusal to punch company time clocks. So stringent is the Seattle labor shortage that some of the workers were given temporary work clearances by the U. S. Employment Service and accepted three day jobs in other war industries.

At Sunnyvale, Cal., a petty squabble between International Association of Machinists Local 68, always a bad actor, and Joshua Hendy Iron Works, a Kaiser satellite, building engines for the Maritime Commission, almost set production on its ear. The question involved was whether the management had the right to order ten hour work shifts.

As school was out June 26 here in Southern California, so many doting mothers rushed home from their jobs in the aircraft plants that the Aircraft War Production Council declared that "production of warplanes is threatened with serious impairment." Six out of every ten new

Farm Problem 1943

Throughout America—indeed, all over the world—the need for producing unprecedented supplies of food with an ever-dwindling labor force has made the farmer's job increasingly difficult. The farmer is not alone in his difficulty; unless the farmer solves his problems the city man will not eat. Solution would be quite impossible but for the many farm machines which multiply the effectiveness of individual men.

In much of the mechanical farm equipment operating today, the vital connecting link between the engine and the working parts is a Twin Disc Clutch. This is but one of the many and varied ways in which the twenty-five years of experience in design, in manufacture and in application engineering, represented by the Twin Disc Clutch Company, are contributing to the health, happiness and general welfare of people everywhere.

No more grueling test of engineering soundness and inbuilt wear-life could be devised than the present situation in which machinery of all kinds—and farm machinery in particular—is being compelled to operate despite inadequate replacements and repairs. In this test, Twin Disc Clutches have demonstrated in full measure the endurance and dependability toward which our quarter-century of business life has constantly been directed.

If you are now planning for future production of any equipment involving driving and driven units, it will probably pay you to get in touch with us at once. A wide line of standard clutches and a considerable reservoir of application experience is here to serve you. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin.

For twenty-five years Twin Disc Clutches have been standard on many nationally known tractors. Their positive toggle action engaging mechanism prevents unintentional engagement or disengagement.

employees hired at the aircraft plants now are women. The area still is desperately short of adequate child care facilities.

The new continuous moving assembly line put in operation last week at Lockheed will double production of P-38 interceptors within the next 60 days and cut manhours per plane 40 per cent, the company claims. The changeover to the new line was acomplished over a period of nine days, during which the P-38's were built on a temporary, open air assembly line while the assembly hangar could be emptied of planes and parts.

THE Ironton No. 2 furnace of Columbia Steel Co. at Provo, Utah, was blown in last Thursday and is now producing pig. This furnace is the second to be blown in in the far West in a little over six months, and means that three furnaces now are producing iron in the far West. Ironton No. 2 is rated at 900 tons daily capacity, and was moved from Joliet, Ill., by the Defense Plant Corp. where it had been idle. It was largely rebuilt and redesigned when re-erected at Provo. Columbia's No. 1 Ironton 600 ton stack was built some 20 years ago, and until the twilight of 1942 was the only blast furnace in the far West. No steel facilities exist at Provo, and approximately 75 per cent of the pig iron produced at Provo has been shipped to Coast plants of Columbia Steel Co. in the San Francisco and Los Angeles areas, with some foundry grade being marketed. The balance of Provo production has been taken by the neighboring plants of Pacific States Cast Iron Pipe Co., which has been lately pressed to capacity, not only because of wartime demands, but because their principal competitors at Birmingham and on the eastern seaboard have been handicapped by the discontinuance of water shipments. Much cast iron pipe still is being shipped all-rail to the Coast, however. In examining the problem which will be faced by the Utah steel plant after the war in competing with shipments from the East by water, the prewar history of the Pacific States Cast Iron Pipe Co. might well be examined as a laboratory specimen. Over the years, Pacific States has added a number of specialty items to its line when demand in its restricted sales territory warranted. These have included high pressure pipe, hydrants, valves, fittings, and special associated, products.

Every thorough study of the problem of how to utilize excess pig iron capacity on the Coast in the post war period has hinted cast iron pipe production, possibly in cooperation with either United States Cast Iron Pipe & Foundry Co., or the American Cast Iron Pipe Co., both of which maintain active sales organizations here. In the better prewar years, probably 120,000 tons of cast iron pipe were sold on the Coast annually, the bulk of it in four, six, eight and twelve in. sizes. That tonnage, supported by growing demand in areas of increasing population, could form a nice cushion for a distressed pig iron producer.

. . . Cited for Awards . . .

• • • The companies listed below have recently been awarded the Army-Navy "E" for excellence in war production:

Philco Corp., Simplex Radio Division, Sandusky, Ohio (white star).

Eastern Tool & Mfg. Co., Bloomfield, N. J.

Chambersburg Engineering Co., Chambersburg, Pa.

De Laval Steam Turbine Co., Trenton, N. J.

Worthington Pump & Machinery Corp., Buffalo Works, Buffalo.

Link Belt Co., Indianapolis.

Defiance Machine Works, Defiance, Ohio.

H. M. Harper Co., Chicago.

Whiting Corp., Harvey, Ill.

Accurate Steel Treating Co., Chicago.

American Thread Co., Dalton Mills, Ga., and **Merrick Mills,** Holyoke, Mass.

American Viscose Corp., Marcus Hook, Pa.

Advance Stamping Co., Detroit.

F. W. Berk & Co., Inc., Woodridge, N. J.

Blaw-Knox Co., Blawknox, Pa.

Christensen Machine Co., Salt Lake City.

Felker Mfg. Co., Torrance, Cal.

Fisher Governor Co., Marshalltown, Ia.

William D. Gibson Co., Division of Associated Spring Corp., Chicago.

A. C. Gilbert Co., New Haven, Conn.

Graham-Paige Motors Corp., Detroit.

Hercules Powder Co., Belvidere, N. J.

A. F. Jorss Iron Works, Inc., Washington.

J. O. Mfg. Co., Southgate, Cal.

J. A. Maurer, Inc., New York.

Pettibone Mulliken Corp., Chicago.

Richards Brush Co., Seattle, Wash.

Slumber Products Corp., Memphis, Tenn.

Westinghouse Electric & Mfg. Co., Meter Division, Newark, N. J.

Maritime Commission

Westinghouse Electric & Mfg. Co., Naval Ordnance Plant, South Louisville, Ky.

Bethlehem Fairfield Shipyard, Inc., Baltimore (merit eagle pennant).

California Shipbuilding Corp., Wilmington, Cal. (merit eagle pennant).

Concrete Ship Constructors, National City, Cal.

New England Shipbuilding Corp., South Portland, Me.

Enterprise Wheel & Car Corp., Bristol, Tenn. (gold star).

Erie Forge Co., Erie Pa. (gold star).

A. P. Green Fire Brick Co., Mexico, Mo. (gold star).

Homestead Valve Mfg. Co., Inc., Coraopolis, Pa. (gold star).

Isaacson Iron Works, Seattle (gold star).

Linde Air Products Co., Inc., N. Y. (gold star).

Minneapolis-Moline Power Implement Co., Minneapolis (gold star).

Russell & Erwin Mfg. Co., New Britain, Conn. (gold star).

Security Engineering Co., Ind., Whittier, Cal. (gold star).

Selby, Battersby & Co., Philadelphia (gold star).

Western-Walker Co., Los Angeles (gold star).

Whitin Machine Works, Whitinsville, Mass. (gold star).

Wickwire Spencer Steel Co., New York (gold star).

Wilson-Snyder Mfg. Division, Oil Well Supply Co., Braddock, Pa. (gold star).

Delta Shipbuilding Co., Inc., New Orleans (fourth gold star).

Houston Shipbuilding Corp., Houston, Tex. (fourth gold star).

North Carolina Shipbuilding Co., Wilmington, N. C. (eighth gold star).

Richmond Shipyard No. 2, Richmond Shipbuilding Corp., Richmond, Cal. (sixth and seventh gold stars).

Ingalls Iron Works Co., Inc., Birmingham, Ala.

General Cable Corp., New York.

Watkin's, Inc., Wichita, Kan.

Todd Galveston Dry Docks, Inc., Galveston, Tex.

Bevis Machine Co., Middletown, Ohio.

Lynchburg Foundry Co., Lynchburg, Va.

Leathem D. Smith Shipbuilding Co., Sturgeon Bay, Wis.

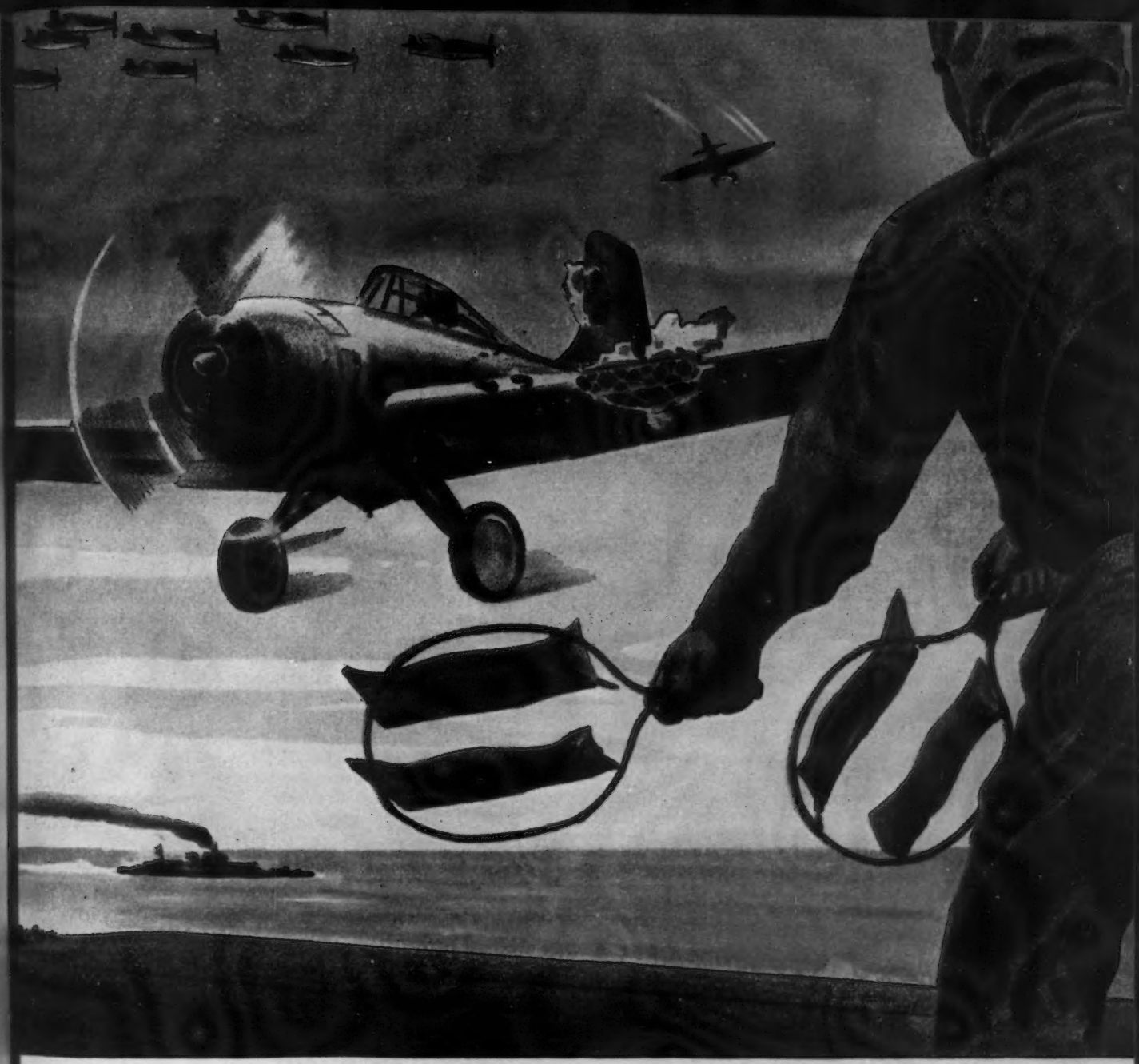
Martin-Parry Corp., York, Pa.

Pennsylvania Range Boiler Co., Philadelphia.

Reading-Pratt & Cady Division of American Chain & Cable Co., Inc., Reading, Pa.

Union Metal Mfg. Co., Canton, Ohio.

Air Reduction Co., Inc., New York.



Helping to "BRING 'EM BACK ALIVE"

Nothing in this war is more heartening than the large number of pilots and plane crews who come back alive from missions of extreme hazard.

Case after case has occurred where planes suffered terrific punishment, yet the pilots managed to bring them home. It is a tribute to the splendid skill of our pilots and the remarkable quality of our planes.

Vickers Hydromotive Controls are an important factor in the exceptional quality of many American combat planes. These high pressure oil hydraulic controls are dependable, accurate, easy to operate, easily adjusted, insensitive to shock and vibration . . . reliable no matter how tough the going.

Vickers Hydraulic Equipment is also used to advantage for the control of many types of production machines . . . machines that are helping win the war . . . machines that will help win the peace.

VICKERS HYDROMOTIVE CONTROLS

Engineers and Builders of Oil Hydraulic Equipment Since 1921

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Application Engineering Offices: CHICAGO • CLEVELAND • DETROIT • LOS ANGELES
NEWARK • ROCKFORD • TULSA • WORCESTER

Fatigue Cracks . . .

BY A. H. DIX

Wanted: Topshelf Press Agent

• • • As head of the Office of War Information, Elmer Davis has the job of dispensing war news in such form and volume that our morale here on the home front will be kept high. Mr. Davis' job is important.

But a far more important and vastly more difficult job is that of interpreting to the man in uniform what is happening on the home front in such a way that he will maintain the proper attitude toward his work. Reports of strikes, inordinate wages and profits, the activities of the get-the-money-now blocs, and gripes about rationing and other inconveniences incident to war are giving the man in uniform the idea that the people back home are willing to make any sacrifice provided it is not inconvenient and entails no pecuniary loss.

The other day a soldier rocked us on our heels by remarking casually, "The war won't end soon because they don't want it to end. They're making too much money." He didn't define "they," but he did add that his opinion was not entirely exclusive.

Obviously the home front needs a high grade public relations counsel to remind the man in uniform that news is made by exceptions, and that the home folks are misrepresented rather than represented by the violators, dollar patriots and whiners who make the front page. Most of us, he should be assured, are pretty decent citizens who are grateful for what he is doing, who are more interested in winning the war than in making a killing, and who instead of whining about the trifling inconveniences that the war has brought upon us will gladly shoulder any additional sacrifices that will bring victory one day nearer.

Stoppers

His "Scatter Gun" Eats from a New Feed Box!—*American Rolling Mill Co.*

The Gestapo would kill to get this information.—*Carnegie-Illinois Steel Corp.*

Dog Days Doggerel

• • • An anonymous Chaucer sends us this quatrain on a letterhead of the Kollsman Instrument Division of the Square D Co., Elmhurst, N. Y.:

> Rarely as dog the tail doth waggie
> Do I peruse a maggie.
> But when ere I can I like to scan
> 'Fatigue Cracks' in Iron Aggie.

We bow to the bouquet but question the soundness of the first line. Tail-wagging by dogs is not rare. The latest canine Crossley shows that one-feeding-per-dayers wag an average of 1.3 per day, while those fed twice a day have a wag rating of 3.4.

Our reader interest indicators now point to all-time highs. Kollsman's Chaucer should therefore change his first line to "As frequently as dogs do breathie. . ."

"E" Missing, Says He

• • • Jack Cosman, brains department alumnus, says it should be "Wiederstand schmelzschweissung," not "Widerstandschmelzschweissung," as we spelled it. We don't know which is correct, but "Wieder" or "Wider," the pronunciation is *vee-der-stond-sehmeltz-shvy-sung*, a very satisfying lingual workout, especially with a mouthful of pretzel. It means "resistance fusion welding." If you can say it right three times fast you get a second helping of blutwurst.

Names That Bite Into the Memory

• • • Speaking of striking names, our current favorite is that of a Russian contemporary poet—Itzik Feffer. In the domestic corporate class we offer Puffer & Darling, which we ran across the other day and which we believe is in either Detroit or Chicago.

Aptronym

• • • A. E. (Chicago Flexible Shaft Co.) Widdifield writes that the editor of the Chicago *Sheep Breeder* is Perry Ewing. To *ewe*, as if you didn't know, is to have a lamb.

Obit for an Anachronism

• • • Although now in its 89th year, your favorite favorite family journal still shows no signs of senility. Its pulse, blood pressure and metabolism are perfect. No member of its staff chews Sen-Sen or shaves with a straight razor. Its offices are spittoonless. The successive changes from quill pen to steel pen to fountain pen and typewriter to teletype were taken gracefully.

With the exception of the member of the brains department who has his stenographer type "89th Iron Age year" on every letter he sends out, we neither flaunt nor conceal our age. In fact, we are conscious of our burden of years only when we hear our Chicago editor referred to as our "western editor."

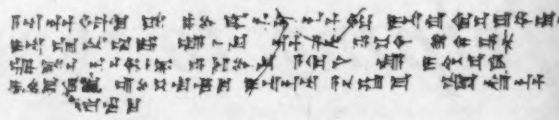
In the '70's our masthead read "Western Office—77 Fourth Ave., Pittsburgh, Jos. D. Weeks, Manager and Associate Editor"—God rest his soul. As the frontier moved farther and farther away from the Eastern coast the title went with it. Obviously it should not have halted at Chicago, for we now have editorial representatives up and down the Pacific Coast. And furthermore "West" is wholly relative. When Horace Greeley uttered his famous injunction to "Go West, young man!" he meant western New York state, and when Frank Oliver, our technical editor, was in Denver recently he was asked, "So you're from the East. Chicago?"

The title "Western Editor" is therefore being sprinkled with lavender and placed in the cabinet marked "Relics," along with David Williams', our founders', quill pen, blotting sand box and "Seward for President" campaign button.

B. C. Expediting

• • • In the office of Hiland G. Batcheller, chief of the WPB Steel Division, is a photograph of a curious document labeled, *"The earliest 'jack-up' for delivery on record in the steel industry."*

We asked him if we could get a copy of it. He said we could, and here it is:



The letter, written in Assyrian cuneiform and dated 1200 B.C., was found in the ruins of the old Hittite capital in central Asia Minor, reads:

> As to the iron about which thou has written me, there is no good iron in my storehouse at Kizwatna. It is a bad time to make iron but I have ordered them to do it. When they finish I shall send it to thee. In the meantime, I send thee an iron dagger blade as a gift.

Puzzles

The larger last week's pipes clogged, and its flow was shut off for 1½ hr. Anyway, that's the answer given us by the Trojan who sent it in.

The June 24 problem was nothing at all to I. A. Billiar, Geo. N. Benoit, and Lt. Com. A. R. Simpson.

We have just about worn out our puzzle book, and are astonished to find there is a dearth of puzzles. Nobody writes new puzzle books. For the past several hundred years every new book has been based on the previous books, simply changing apples to pears, sous to pennies, horses to pigs, etc. So we are reduced to such a trifle as this:

> *If I were to give 7 cents to each of the beggars at my door, I would have 24 cents left. I lack 32 cents of being able to give them 9 cents apiece. How many beggars are there, and how much money have I?*

SCALES

THAT DO *MORE* THAN YOU EXPECT

OF course, Fairbanks Scales are big, husky, and accurate. You have a right to expect these things in *any* good scale — and particularly of Fairbanks Scales with the world's broadest scale manufacturing experience behind them.

The feature about Fairbanks Scales that may surprise you the most, is their ability to do things you *don't* expect of scales.

Here are a few of many jobs done by Fairbanks Scales:

- They count small parts — more accurately than manual counting
- They weigh carloads of coal in motion and make a printed record of each weight
- They automatically control paint ingredients
- They automatically control aggregates
- They "keep the books" in steel plants, making printed records of incoming and outgoing shipments
- They keep accurate records on chlorination in water treatment
- They record the *flow* of liquid chemicals
- They guard secret formulas in compounding
- They control batching in bakeries
- They prevent disputes by eliminating the human element in weighing.

AND all of these things, only the beginning of the story, they do automatically and mechanically thereby eliminating human errors.

How Fairbanks Scales can be fitted into your production flow to speed up operations and eliminate errors may prove to be the most interesting discovery you ever made. Investigate now. Write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.

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PUMPS
MOTORS
GENERATORS
SCALES

WATER SYSTEMS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS
RAILROAD EQUIPMENT

FAIRBANKS SCALES

Scales

Dear Editor:

RECLAIMING FILES

Sir:

In a recent issue of your publication, I saw a chemical formula for reconditioning files. Will you kindly send me a copy.

J. T. WALKER,
Manager

National Safety Device Co.,
1039 N. Crosby Ave.,
Chicago, Ill.

● The reclaiming process, as suggested by Jason R. Harris, of RCA Mfg. Co., Indianapolis, is:

(1) Clean file with wire brush wheel to remove deeply imbedded particles.
(2) Clean and rinse file thoroughly, using ordinary degreasing solution.
(3) Dip in solution made up of following (by volume):
800 cc. water
150 cc. nitric acid
100 cc. sulphuric acid
(4) Cold water rinse.
(5) Hot water rinse.
(6) Cyanide dip to neutralize.
(7) Cold water rinse.
(8) Hot water rinse.
(9) Dry thoroughly.

—Ed.

MACHINE TOOL PAINT

Sir:

Will you please advise me where I can get information on the proper painting of machine tools for increased visibility, including high-light painting of certain parts?

KNOX A. POWELL,
Research Engineer

Minneapolis-Moline Power Implement Co.,
Minneapolis, Minn.

● Many of the paint manufacturers have issued booklets on this subject. A recent one is "Three-Dimensional Seeing," by E. I. du Pont de Nemours & Co., Finishes Division, Wilmington, Del. We also recommend you ask Dupont for a copy of the paper, "Salvage Waste Light for Victory," by Arthur A. Brainard and Robert A. Massey, presented last September before the Illuminating Engineers' Society, at St. Louis.—Ed.

VERMICULITE

Sir:

In the June 3 *News Front* you mention Vermiculite as being used in the new process of porcelain enameling. Can you give us more information?

D. E. BOURRIE,

F. E. Schundler & Co., Inc.,
504 Railroad St.,
Joliet, Ill.

● We recommend that you get in touch with the So. Africa Mining Journal, Ltd., 201-207 Jubilee House, Simmonds St., P. O. Box 963, Johannesburg, Union of S. Africa. —Ed.

PLATED CUTTING TOOLS

Sir:

Several months ago you published some articles on hard chromium plating for metal cutting tools. We are under the impression that this hard chromium plating was, strange as it may seem, developed by some department of *Collier's* magazine. Will you be good enough to give us the name of the party to whom we might write, regarding this hard chrome plating, as we have a peculiar problem that might possibly be solved by the application of this hard chromium plating process?

ROBERT HOFSTETTER,
Chief Engineer

Department of Justice,
Federal Prison Industries, Inc.,
Washington, D. C.

● The article appeared Dec. 10, 1942, under the title, "Tool Life Increased by Improved Chromium Plating Process." The process was developed by Axel E. Lundbye, chief engineer of the Crowell-Collier Publishing Co., Springfield, Ohio, whose interest in the subject was aroused by a desire to lengthen the life of "doctor" blades, which are used to scrape ink off the rollers of printing presses. If the article does not answer all questions, Mr. Lundbye may be willing to furnish additional information.—Ed.

WELDING CHART

Sir:

We read with great interest the article, "Arc Welding Speed and Cost Figured Graphically," in your issue of May 27, by Herbert A. Davies, manager of the Virginia Bridge Co., Birmingham, Ala. We believe the chart is extremely valuable. Do you plan to reprint this chart in larger form on some kind of durable paper so that it can be used by estimators, who would no doubt find it invaluable?

S. KULICK,
Asst. Secy.

Michael Flynn Mfg. Co.,
Allegheny Ave. at Tulip St.,
Philadelphia, Pa.

● At the moment we have no plans for reprinting the chart in larger form, but you may photostat it in an enlarged scale and glue it to heavy cardboard, applying clear lacquer or varnish to preserve the face of the chart.—Ed.

CLYDE-WELD PROCESS

Sir:

Will you please forward any information you may have regarding the Clyde-Weld process of joining metals?

H. H. GODFREY

Dobbins Mfg. Co.,
Elkhart, Ind.

● This is the first time we have heard of this process. Can any reader help Mr. Godfrey?—Ed.

ELECTROFORMING

Sir:

Where can we obtain complete information regarding the Ekko process of electroforming?

RICHARD L. DINELEY

Southern Engineering Co.,
818 West Fifth St.,
Los Angeles, Cal.

● From the United States Rubber Co., 1230 Sixth Ave., New York.—Ed.

TATA MAKES WORLD RECORD

Sir:

The merchant mill of the Tata Iron & Steel Co., Ltd., Jamshedpur, India, rolled 19,700 long tons in February 1943, working 78 eight-hour shifts. It rolled rounds 11/16-in. to 2½-in. dia., flats ¼-in. to 1-in. thick and small angles of different sizes totaling 30 sections, with 200 roll changings in the month.

The mill is of cross-country type, comprising six continuous 14-in. stands and four semi-continuous 2-high 12-in. stands supplied by the Morgan Construction Co. This was started in 1924. The output of 19,700 tons in a month is the highest so far obtained in this type of mill.

In its sheet mill section, Tata installed early in 1940 an additional hot sheet rolling unit consisting of one 3-high roughing mill (Lewis) and one 2-high finishing mill with mechanically operated tables. The tables at the finishing mill, the pair and the pack furnaces and most of the other equipment were supplied by the Wean Engineering Co. In the first year of its operation, April 1940 to March 1941, this unit produced 44,308 long tons of sheet with an average gage of 0.98 lb. per sq. ft. This is considered to be a production record for the gage of sheets rolled. The number of shifts operated during the year was 822, and the average output per shift was 53.9 long tons.

The world record production per eight-hour shift at the finishing mill of this unit for 24-gage black sheets was 83.37 long tons, the average gage of black sheets being 0.94 lb. per sq. ft. The record output was obtained in the first week of May 1940, only five weeks after the new unit had come into operation.

J. J. GHANDY,
General Manager

Tata Iron & Steel Co., Ltd.,
Jamshedpur, India

BRONX CHEER FOR NEWS FRONT

Sir:

Although we have subscribed to THE IRON AGE for many years, you don't know us. We are an obscure little company down in the corn belt, but for forty years have been world leaders in safety devices for railroad side tracks. You will find our material in every country where railroad practice is similar to that in America.

Please see the enclosed circular as a sample in the way we advertise. Compare it with your *News Front* page and you will understand what we mean when we say that we try to make our printed matter easy to read.

We generally read Van Deventer when there is a punch in the first sentence or in the last paragraph. It would take more than this to get us to wade through the dreary typography and underlining of *News Front*.

S. W. HAYES

Hayes Track Appliance Co.,
Richmond, Ind.

NOT IN THE PUBLIC EYE

● The name plate on a post-war auto, or tractor, or refrigerator may be one familiar to all, but the unbranded steel stampings on it may be Transue's. Although unidentified, they will be chosen by these manufacturers on merit, service and experience. Specializing in deep-drawn stampings, for civilian products in peace, for war equipment in war, Transue thus contributes to the reliability of products by American industry.

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This Industrial Week . . .

- ***Slight Tapering in Production Noted***
- ***War Leaders Press for Planes, Ships***
- ***Battle Between WPB and Army Flares Again***
- ***McCarren Would Decentralize Steel Industry***

A RECESSION from the high production tempo prevailing since Pearl Harbor appears to be developing in some manufacturing areas. Reminiscent of the seasonal slumps experienced in peacetimes, it has not reached large proportions yet and may be very short-lived. In addition to the need for a little recuperation after 19 months of pressure, there are psychological factors such as the lull in the Allies' advance toward the Continent, the changes in military requirements, the recent audacious coal strikes, the hot weather—factors which when combined might explain a slight letdown.

However, authorities directing the war effort, picturing probabilities six to 12 months away, are starting to drive harder than ever for airplanes, ships, steel mill equipment and locomotives, among other items. All the facts seem to emphasize anew the often-repeated warning that there is little hope for more civilian steel for some time to come. Lend-Lease demand is increasing. One new military project to come out recently is 50,000 floats made of steel for the engineer corps.

THE battle which has seesawed for the past two years between the WPB and the Army flared again during the past week when the Army intensified efforts to take away most of the WPB's authority over allocations of material through cutting the Class B List of products under CMP. At the end of this year, WPB now plans, under Army pressure, to voluntarily reduce its jurisdiction over more than 300 Class B product classifications to a mere 22. This means that WPB may relinquish authority over approximately 3,000,000 of the 5,000,000 tons of steel handed out to Class B product manufacturers per quarter. Under the new plan the services would order most of the Class B products and dole out the material for their manufacture.

For months, the fact that large tonnages of steel were given by WPB to the Class B product makers annoyed some military officers. The recent grant of additional steel to farm equipment makers when the Army and Navy claimed they lacked sufficient steel created arguments which probably will be echoing in Washington far into the future.

News Highlights in This Issue

Steel Drive Stars	103	War Supply Picture	114
Chicago Steel Meet	106	CMP News	114A
Coke Oven Program	107	WPB To Cut Class B	114D
Foundry Problems	108	Foreign Patents	115
Current Thinking	108	Machine Tools	158
New Steel Figures	111	Non-Ferrous	160
War Contract Bill	112	Scrap News	162

The burst of activity among builders of railroad locomotives has created additional business for machine tool builders. At the same time there are indications that the rejuvenation of railroad shops after the war will provide a boost for machinery makers. Possible large contracts for new machine tools for Russia are being discussed currently, with the talk about Mexico absorbing large quantities of used equipment.

LEND-LEASE Administrator Edward R. Stettinius, Jr., has announced that 250,000 tons of semi-finished and finished steel, originally purchased for Russia but unshipped for a variety of reasons including the emphasis placed on food for the Soviet, is being distributed among American consumers. The tonnage includes various kinds of material that for different reasons had not been shipped and much of which is no longer needed by Russia. Barbed wire represents a considerable tonnage. There is also much shell tonnage which, like other kinds of steel, has become obsolete.

The Lend-Lease steel for American use will not be an important factor in connection with the big drive to increase the third and fourth quarter supply by 1,000,000 tons each, because redistribution of Lend-Lease steel has been in full operation for about two months.

Conflicting statements have been made recently by various authorities concerning molybdenum, tightest of all materials not long ago. Molybdenum supply and demand now are more or less in balance, according to latest WPB figures. Two months ago, the services were taking about 500,000 lb. of molybdenum a month out of stocks. Now this is no longer true. Stock withdrawals have diminished so greatly that they may be said to be inconsequential, WPB says. The reason for the brightened picture is that molyb-

Iron Age Lists Seized Patent Applications Offering Many Ideas

• • • Small firms as well as large corporations are eligible to use the 50,000 patents which the United States has seized from enemy and enemy occupied nations. Many of these are potential gems for aiding current and post-war production. As a service to readers, THE IRON AGE in this issue lists several hundred of the seized applications for patents, starting on page 115. If interest of readers is sufficient, additional lists will be published in this magazine.

denum bearing turnings have been used to a greater extent. The increased use of these turnings has been made possible because Army and Navy specifications are calling for chrome-nickel-molybdenum alloys more frequently.

THE possibility that H. G. Batcheller, recently elevated to operations vice-chairman of WPB, may supervise the CMP Division is being discussed at Washington. This would be in addition to his supervisory control over the Steel, Copper and Aluminum Division. To succeed Batcheller as head of the Steel Division, John T. Whiting, head of Alan Wood Steel Co., has been selected.

Meanwhile, an attempt to decentralize the iron and steel industry is being formulated by Senator Pat McCarren, Democrat of Nevada. He proposes to do this job, tried on many occasions previously by members of Congress, by the formation of a coalition bloc of 56 Senators. McCarren would not disperse existing iron and steel plants but advocates the building of new units of an indefinite character. His appeal to his 55 colleagues is based on the fact that their states have deposits of coal and iron ore.

OUTSIDE of the acute shortage of manpower, dwindling profit margins under OPA price ceilings are a source of concern to foundry operators. Gray iron producers, who turned out 14,500,000 tons in 1942 for priority products, expect to make around 12,000,000 tons this year. . . . Makers of by-product coke ovens, which are just about as complex as any equipment which the steel industry requires, are after higher priority ratings and the elimination of the three-bid restriction in order to help speed completion of the steel industry's expansion program.

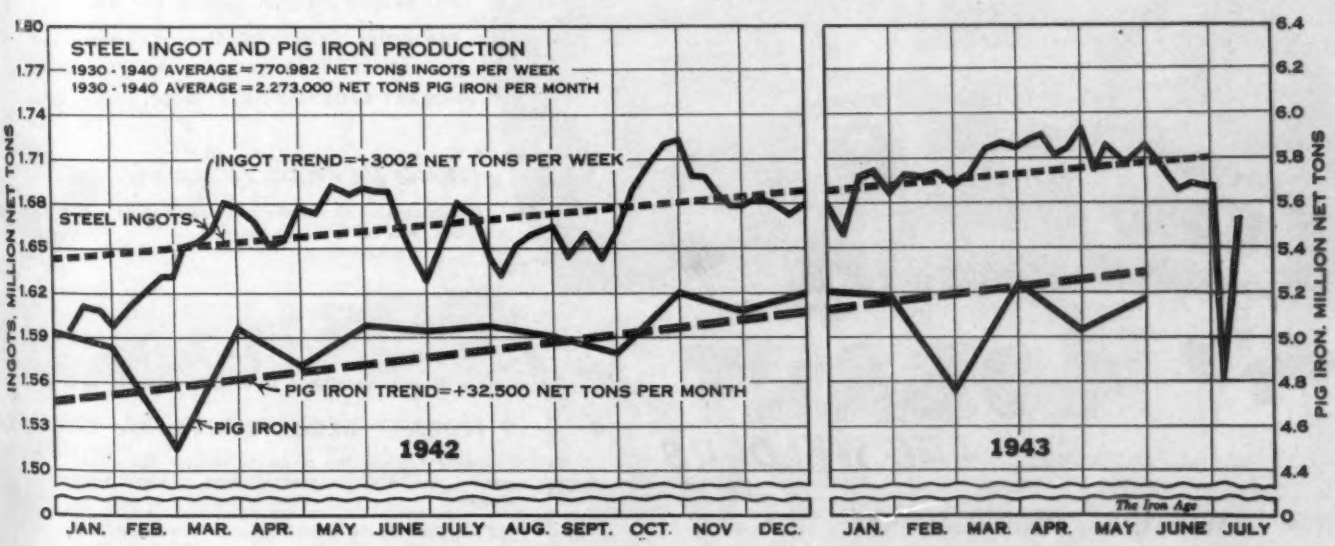
This week, almost two weeks after John L. Lewis gave the back-to-work order, miners in the Birmingham and Western Pennsylvania districts were nearly 100 per cent back on the job. But whether the period between now and Oct. 31 will be fraught with new outlaw coal mine work stoppages remains to be seen. The issue has not been settled and some observers expect recurring trouble until the miners have a contract and some sort of a raise. A late check indicates that the three coal strikes have cost the nation about 170,000 tons of steel as reported in THE IRON AGE last week. Intangible adverse effects of the coal strike probably will exert their influence for the duration.

Whiting New Director of Steel Division

Washington

• • • John T. Whiting, president of the Alan Wood Steel Co., Conshohocken, Pa., has been named director of the WPB Steel Division, succeeding H. G. Batcheller who has become WPB vice-chairman of Industry Operations. Mr. Whiting has been deputy director of the Steel Division under Mr. Batcheller.

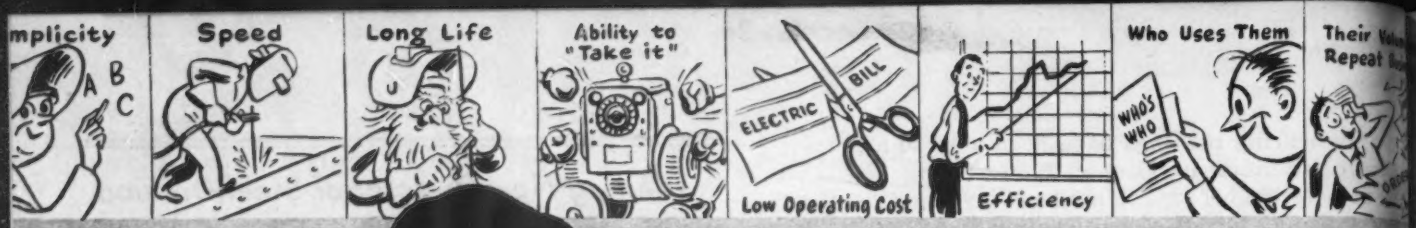
THIS week's ingot rate rebounded to 96.5 per cent of rated capacity from last week's revised rate of 95.5 per cent. Pittsburgh operations are up 7 points to 98 per cent and Philadelphia output has gained a point to 93.5 per cent. Steelmaking at Buffalo has increased two points to 106.5 per cent while at Wheeling the rate jumped four points to 88 per cent. Birmingham is back at 102 per cent from last week's drop to 99. At Detroit operations have gained three points to 107.5 per cent. Down half a point to 97.5 per cent is output in the Chicago district while at Youngstown operations have fallen three points to 93.5 per cent. Cleveland is down a point and a half to 96 per cent. Also down are the ingot rates at Cincinnati, which is off two points to 107 per cent, and in the Eastern district where it has fallen 21.5 points to 85.5 per cent. St. Louis operations are unchanged at 99 per cent.


STEEL INGOT AND PIG IRON PRODUCTION
1930 - 1940 AVERAGE = 770,982 NET TONS INGOTS PER WEEK
1930 - 1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
INGOT TREND=+3002 NET TONS PER WEEK
STEEL INGOTS
PIG IRON TREND=+32,500 NET TONS PER MONTH
PIG IRON
INGOTS, MILLION NET TONS
PIG IRON, MILLION NET TONS
1942
1943
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV DEC.
JAN. FEB. MAR. APR. MAY JUNE JULY
The Iron Age

Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	S.Ohio River	St. Louis	East	Aggregate
July 1	89.0*	98.0	96.5*	92.5	97.5	104.5	84.0	99.0	104.5*	102.0	109.0	99.0	107.0	95.5*
July 8	98.0	97.5	93.5	93.5	96.0	106.5	88.0	102.0	107.5	102.0	107.0	99.0	85.5	96.5

* Revised



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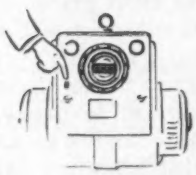

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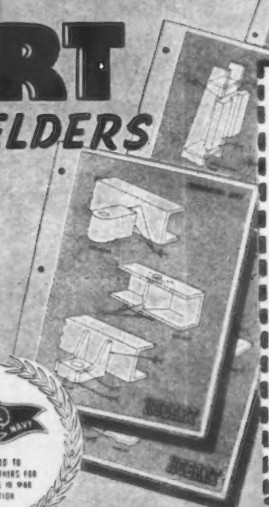

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Labor and Management Plunge into Campaign for More Steel At Rallies in Chicago and Pittsburgh

NEWS OF INDUSTRY

Pittsburgh

• • • **If the promises made** here last week by the WPB, steel company management and the United Steel Workers of America are fulfilled, and there is every indication that they will be, the government's drive for more steel in third and fourth quarters of this year not only will be realized but may be exceeded.

Although the main topic here last Thursday and Friday was "more steel for the armed forces" history was made in employee and management relations. Mass meetings at two steel plants were addressed by governmental, management and union representatives and the general plea was a united front for more steel production. Donald M. Nelson, WPB head, in asking for more steel assumed the responsibility for seeing that those consumers who had more steel than they needed would give way to the demands of those who needed it immediately but were not in a preferential condition to get it. Benjamin F. Fairless, U. S. Steel Corp. head, J. Lester Perry, president of Carnegie-Illinois Steel Corp. Joseph Carter, president of Pittsburgh Steel Co., H. E. Lewis, president of Jones & Laughlin Steel Corp., and other steel officials in the Pittsburgh district pledged their part to the success of the "Steel For Victory" program. Equally important to these promises was a dramatic plea by Philip Murray, CIO head and president of the USWA, to "quit this messing around, discontinue some of the general confusion and let labor and management work together and show what they can do to win the War."

As pointed out in previous issues of THE IRON AGE, the drive for more steel is not restricted to increased steel production alone. The general program includes a drive for more actual steel ingots in the third and fourth quarters, an increase in steel production by speeding up the completion of new units and the inspection and checking of steel inventories throughout the country for the purpose of encouraging those consumers with sufficient steel to hold back orders and let those who need it most get it first.

On the question of speeding up new steel expansions, it is known that WPB is directing its attention toward completing seven major projects. Expediters have been sent to major steel equipment plants to see that such machinery as blooming mill equipment is dispatched to those steel projects which can use it first regardless of delivery promises.

There is every indication that such a request for diversion will be backed up by extreme WPB pressure. For instance, one blast furnace in the Pittsburgh district which is needed badly because another furnace of the company stands a chance of being blown out soon for repairs may find equipment for other blast furnaces diverted to it on an emergency basis so that there will be no interruption in steel production at this plant.

It is also expected that work will be hastened on the large electric steel project of the Republic Steel Corp. at Chicago. Likewise, it is understood that the green light has been given to the Carnegie-Illinois Steel Corp. Homestead project. WPB steel officials visiting this plant last week saw

the third open hearth furnace in operation following the opening a few weeks ago of the first two units out of the 11. Present schedules call for at least two more open hearth furnaces at the Homestead project to be put in operation within the next 20 or 30 days making a total of five out of 11. Homestead officials off the record indicated that WPB pressure on new steel projects was having its effect.

This week more than 600 WPB representatives have been checking the inventory records of more than 2000 steel consumers to determine how many can forego current steel orders by depending on inventories and thus produce space on steel rolling mills for other urgent war requirements. The method of carrying out this plan is to encourage and perhaps demand that a steel consumer with 120 days steel supply cancel his orders and allotments on those items which he does not need thus giving room for other steel consumers who are in a position to use those particular items. The thoroughness with which the WPB is conducting its inventory drive is expected to produce tangible results.

The third major point in the government program for more steel is the old story—"one can always do more than one is doing." It is this phase of the program where the steel industry is expected to produce a greater tonnage of steel ingots regardless of heat waves, coal strikes, steel strikes and shortages of critical materials such as coke. Steel leaders in Pittsburgh already have pledged their part in the program.

A significant sign in the inspection trips and meetings in Pittsburgh last week was the unmistakable merging together of management, labor and government. Although there have been more than 400 "quickie" strikes in the steel industry since Jan. 1, there is every indication that the USWA is going to put more pressure on its local unions to prevent such outlaw stoppages. The tone of Phil Murray's talks at Pittsburgh last week definitely indicated a strong attitude backed up by extreme pressure to eliminate future work stoppages at steel plants. This was indicated in Murray's talk at the Pittsburgh Steel Co. plant at Monessen when he appealed to steel workers "to do just a little more than they were doing

DONALD M. NELSON, WPB head, and Philip Murray take a look at a heat of steel at the Homestead Works.

REQUIREMENTS	6,395,000	4,575,000	2,779,000	2,245,000	1,957,000	1,862,000	766,000	580,000	527,000	441,000	383,000	381,000	281,000	183,000	41,000	41,000	35,000	30,000
SUPPLEMENTARY ALLOTMENTS	348,000	—	106,000	5,000	61,000	33,000	—	—	—	25,000	—	—	2,000	—	1,000	—	—	—
ORIGINAL ALLOTMENTS	4,749,000	3,913,000	2,420,000	1,210,000	1,670,000	1,150,000	650,000	525,000	440,000	345,000	290,000	290,000	193,000	301,000	34,000	20,000	35,000	15,000

* Includes Power and Communications

REQUIREMENTS VS. ALLOTMENTS FOR THIRD QUARTER: Scale at left is in millions of net tons. In this chart requirements are the shaded areas; supplementary allotments are the white areas, and original allotments are shown in black. Carbon steel requirements totaled 20,261,833 tons while original allotments were 15,340,385 tons and supplementary allotments were 539,000 tons. In alloy steel, requirements were 3,240,461 tons, while original allotments were 2,627,724 tons and supplementary allotments were 61,265 tons.

and end any confusion which might be holding up the war effort."

Pointing out the desires of the country's military leaders, Donald M. Nelson, chairman, WPB, told hundreds of management-labor committees at the William Penn Hotel last week, "The nation's military leaders are counting on the spirit and determination of the American citizens to put the needs of our fighting forces ahead of every personal consideration, and that confidence which the

KING H. McLAURIN, general superintendent, Carnegie-Illinois Duquesne Works, explains electric steel production to Donald M. Nelson.

boys at the front have in the production soldiers behind the line cannot and will not be displaced. Occasionally there may be spectacular disturbances on the surface. I am positive that these do not touch the steadfast energies of the nation as a whole."

While Mr. Nelson was making these remarks last week stubborn revolts against the "back to work order" of the UMW union threatened further steel losses in the Pittsburgh district due to a spread of wildcat strikes in the coal regions. Even though the situation has been further clarified after the 4th of July steel losses were probably greater than earlier estimates which up to last week according to Hiland G. Batcheller amounted to more than 126,000 tons for the third strike.

Calling attention to the fourth shift

DONALD M. NELSON, WPB chairman (second from left) and C. E. Wilson, executive vice-chairman WPB (right) talk to Philip Murray (left) and B. F. Fairless (third from left) as they arrive at the Allegheny County Airport to start the Steel for Victory Campaign.

("The millions of boys who are working not 48 hrs. a week but 24 hrs. a day on the most dangerous assignment that a man can be given") Mr. Batcheller, operations vice-chairman of WPB, said, "They want steel more desperately than they ever wanted anything in their young lives. They are not interested in hours of work. Rates of pay mean nothing to them. They are not interested in salaries or in dividends or in vacations. The boys on the fourth shift want steel, rolled and forged into weapons by which the Japs and Germans can be shot and beaten into unconditional surrender."

Warning against complacency, Charles E. Wilson, executive vice-chairman, WPB, said "Although we have reached the end of the beginning let us not take it for granted that this is the beginning of the end. Rather it is an intermediate stage in which the grim determination of our people to win the fight must whittle down the enemy's strength and morale to the point where he crumples. That happy moment is still far ahead. The enemy still retains great and sinister power. It will be a hard job to bring him to his knees."

Accepting the challenge to labor, Philip Murray said—"Almost daily we read of some new production record in steel. Management deserves credit, but management deserves no more credit than do the men who make steel. New production records are possible only because of the highest degree of cooperation between labor and management. It is in this spirit of cooperation that the United Steel workers want to tackle this latest production challenge—this challenge which calls for an extra two million tons of steel in the next six months."

Plants inspected by WPB officials included various Carnegie-Illinois Steel Corp. works, Pittsburgh Steel Co.'s Monessen Works, Allegheny Ludlum Steel Corp., at Brackenridge, Pa., and Jones & Laughlin Steel Corp.'s Aliquippa Works. The management-labor committees which attended the "steel for victory drive" dinner last week came from every steel company in the district.

How Steel Will Be Obtained

• • • Some confusion has surrounded the government's aim for more steel in the third and fourth quarter. The goal is 2,000,000 tons but not all this is expected to result from increased ingot production. The plan according to H. G. Batcheller, vice chairman of WPB, is as follows:

1. Increased production through stepping up expansion projects to an earlier date than was recently anticipated. The green light has been given to expedite the completion of seven major projects.

2. Share the Steel drive. More than 600 WPB men have fanned throughout the country to cover large steel consumers in an effort to check excess inventories. Those who can afford to will be asked to cancel orders and allotments so that this space may be available for those who urgently need this steel.

3. Increased steel production from existing capacity on the basis that "more can be done than has been done."

From the three phases above, more steel is expected to be available for the war effort. Full details of the campaign were published in this magazine June 17, page 95; June 24, page 91, and July 1, page 91.

Failure to Supply More Steel May Lengthen War, Chicagoans Told

Chicago

• • • **The steel supply** situation is the most critical of all materials in the war program, Charles Halcomb of the WPB iron and steel division told metal plant executives at the meeting here Friday launching the "Share the Steel" drive locally.

The steel situation is more serious than is generally realized, he said. The idea that steel might be available for general civilian use is absurd, Halcomb emphasized. So far as steel is concerned, he added, the last six months of 1943 are going to be the most critical of the war. If the available steel supply cannot be increased it may be necessary for the armed services to "pull their punches," Halcomb said, thus lengthening the war.

Halcomb's remarks were in explanation of the urgency of the drive which is designed to eliminate unnecessary inventories of steel in consumers' plants. Meetings similar to the Chicago gathering were held at Milwaukee and Indianapolis during the week.

Halcomb gave the following picture of the steel situation for the third quarter: Requests of all claimant agencies for the quarter totaled 23,500,000 tons, while the expected supply of steel amounted to only 17,250,000 tons, or only 74 per cent of the requested steel. All the requests of the claimant agencies were cut back to bring these two figures in line. This was immediately followed by requests by the services for supplementary allotments. However, Halcomb explained, these requests could not be granted for under CMP all the available supply had already been allocated and such requests, if granted, would have been the equivalent of a rubber check.

Examples of how the requests from the claimant agencies were cut back, as cited by Halcomb, follow:

B Product producers:	Requested	6,400,000 tons
	Allotted	4,700,000 tons
Army:	Requested	4,500,000 tons
	Allotted	3,900,000 tons
Maritime:	Requested	2,800,000 tons
	Allotted	2,100,000 tons
Defense Transportation:	Requested	2,250,000 tons
	Allotted	1,250,000 tons
Navy:	Requested	1,900,000 tons
	Allotted	1,650,000 tons
Lend-Lease:	Requested	1,800,000 tons
	Allotted	1,100,000 tons

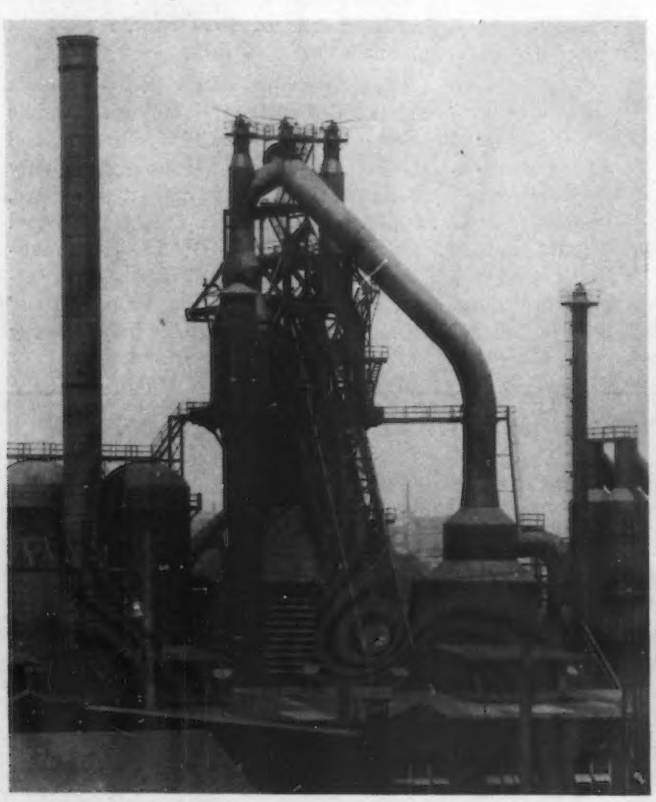
It was stressed that in the Share the Steel drive, which will officially close July 22, it is not planned to take physical possession of excess inventories nor is it planned to move such inventories from one plant to another. Instead, by bringing such supplies to light, the holder is expected to reduce his orders by that much or to cancel an equivalent tonnage on order so that mill space can be used to fill other orders.

It was stressed that under CMP it should not be necessary to have inventories. Steel producers are required to accept all orders tendered them up to 105 per cent of their capacity. This means, Halcomb said, that acceptance of a CMP order assures delivery around the date requested. Hence, inventories should not be necessary.

The plant executives were warned not to confuse form WPB-3029 with this drive. It has no connection.

The Chicago meeting, attended by some 350 men, was sponsored by WPB, the armed services, the National Association of Manufacturers, the National Metal Trades Association and the Chicago Association of Commerce.

NEW BLAST FURNACES: At right is the Ironton Works blast furnace in Utah, discussed in this issue in the "West Coast" column. At left is new stack blown in July 1 at Bethlehem Steel Co.'s Bethlehem plant. It is a large furnace similar to the one Bethlehem started at Lackawanna recently.



Abandon Three-Bid Restriction To Speed Program, Coke Oven Makers Urge

New York

• • • **Higher priority ratings** and the elimination of the three-bid restriction are two aids sought by some makers of by-product coke ovens in order to help speed completion of the steel industry's expansion program.

The coke oven program constitutes one of the most serious bottlenecks in steel industry expansion. Between 7,000,000 and 7,500,000 net tons of by-product oven capacity (the total varies a little as compiled by various authorities) will be brought in to support the blast furnace expansion. But, according to the WPB Steel Division, only 2,206,000 net tons of this new capacity was in operation May 1, 1943. Authorities hope to rush the entire program to its conclusion before next Jan. 1.

Construction of this type of equipment is just about as complex as any which the steel industry requires. Although the ovens may be standard, each installation has its own problems, depending upon the desires of the purchaser and the location of the plant. Employing men who know the business is difficult, for it is a highly specialized field.

Using a wide range of critical materials, coke oven builders constantly during the war have been competing with the military services to obtain a share of the limited supplies. Copper, lead, tin, tungsten, rubber, chromium and other materials are among the supplies necessary. Instruments which are similar to those used in submarines are found in by-product coke oven plants.

Pumps, blowers and steel castings have been difficult to obtain. Priority ratings held by the coke oven builders have been around the level of AA-2X, not so good under today's conditions.

The government requires coke oven builders to obtain three bids on subcontract work, even for $500 worth of bolts. On certain jobs which the builders desire to let out, it is difficult to obtain three bids. Some of the prospective subcontractors have been under such pressure from all types of customers that they have shunned new work.

Recently, a builder received three bids on a $23,000 job, all of which were within $45 of each other. The low bidder was not the one who could make quickest delivery, however. One of the higher bidders was able to promise eight weeks' faster shipment.

With 56 days' coke supply for the war program hanging in the balance, the builder sought permission to award the order to the bidder offering fastest delivery. But this permission was not obtained easily. It required between two and three weeks of letter writing, telephone calls and traveling before the builder was told that he could accept the high bid provided he obtained a WPB directive to that effect.

Examples such as the above cannot be called usual, but they indicate why under today's conditions it requires longer to construct new by-product oven plants than in normal peacetimes. The amount of paper-work is terrific, and even a record must be kept of telephone calls.

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TWO WORKERS, FAR SEPARATED, ARRIVE AT SAME GOOD IDEA: A "full house" of employees every day — this was the idea thought up about the same time by Lenore Kroll, of Reliance Electric & Engineering Co., Cleveland, left, and by Ed Gable, of Parish Pressed Steel Co., Reading, Pa., right. It's purely a coincidence as the plants are far removed from each other. Lenore is shown with her poster.

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Price Situation, Manpower Shortages Are Twin Problems Facing Foundries

New York

• • • **After hurdling** scrap and pig iron shortages and numerous other difficulties in the past two years while encountering intensive pressure for peak war production, foundrymen now are confronted with two formidable problems — the price situation and manpower shortages—which rate about on a par with each other in seriousness.

All the leading types of foundries, whether malleable, steel, gray iron, or non-ferrous, are pondering the twin problems. Costs are higher in many supplies and especially labor; scrap losses caused by inferior labor are higher, accidents have risen and absenteeism is a troublesome factor.

Take the current position of the gray iron foundries, for example. W. W. Rose, executive secretary of the Gray Iron Founders' Society, Inc., says that a solution must be found if production is to be maintained. Reviewing the past two years and analyzing his industry's current position, he says:

"Scrap was the first serious problem that arose shortly after our Society opened its Washington office for the duration. The initial price order was issued after many conferences in which representatives of the foundries participated. The result was to interrupt the customary flow and, in the instance of some localities in the country, it operated to guide that flow into some areas to the exclusion of others. Through the method of 'cut-and-try' and repeated amendments a working basis was finally arrived at whereby each foundry center appears now to obtain their fair share of this limited and necessary raw material.

"Pig iron, in the meantime, had become a most pressing problem. The supply was definitely limited and the government handling known quantities. The pig iron allocation order, M-21, was definitely not written with gray iron foundries in mind. It presupposed a back log of orders whereas gray iron foundries have, for the most part, operated on the principle of today's orders for yesterday's delivery. This situation was accentuated by the appearance of one limitation order after another which bit deep into the foundries' customary lines of business and necessitating rapid adaptations to other and less restricted consumption.

"This situation was pointed out to the authorities prior to the issuance of this order, but since steel was uppermost in their minds, necessary changes were not made.

"However, a silver lining appeared in the cloud. Those operating the allocations were far-seeing and not unacquainted with the foundries nor the importance of their product. They employed that rarest of attributes known as common sense and, before many months had passed, the foundries had become familiar with the working of PD-69 and pig iron emergencies became fewer and fewer.

"It was really extraordinary how quickly the officials of this Pig Iron Section could recognize and correct an inequity and the industry owes more than it realizes to the intelligent, sympathetic and unfailingly courteous treatment of their problems by these competent officials.

"Now, as to production, that is one of the miracles of modern times. With

NO IDLE TALK—*Brief Thoughts Expressed Recently*

"WE haven't declared any dividends so far because all our money has gone for rent and new machinery." — Billy Nichol, 14, head of the Midget Mfg. Co., Chicago, which employs eight boys and makes trouser hangers for the Army, speaking in New York last week.

"SMALL business has both a right and a duty to survive, since it is only in the smaller business that the traditional aspects of free enterprise reside today . . . If only large and monopolistic enterprises survive, then the very principle for which we are fighting would be lost."—American Business Congress in letter to Office of War Mobilization pledging support.

"FARMER boys are making more money in a factory in one year than the farm is worth upon which their father has been trying to pay a mortgage for a lifetime."—Rep. Albert J. Engel, Republican of Michigan, backing miners' wage demands and assailing private war industries as paying "excessive wages."

"SOME estimates indicate that the machine tool industry has satiated its principal markets for perhaps a quarter of a century, or at least until 1960."—Federal Reserve Bank of Chicago survey report of the machine tool industry.

"IF it (the government) intends to operate these plants and compete with private industry the free enterprise system in this country is doomed . . . General Motors alone is carrying a daily inventory of war materials of more than $500,000,000, practically all of which would be rendered worthless."—Alfred P. Sloan, General Motors Corp. chairman, calling upon the government to outline its plans for postwar operation of the war plants in which it has invested almost $10,000,000,000.

"I COULD give example after example showing that tremendous sums of money are simply being thrown away with a scoop shovel."—Senator Harry S. Truman on the $71,507,678,873 Army Appropriation Bill passed by the Senate and sent to conference on June 29.

"AS things now stand, I'd rather have the job of providing the ships than of finding cargo for them."—High official of War Shipping Administration.

"I RECOMMEND that the renegotiation law be amended so that Congress will provide a test as to what is not excessive profits, to be used as a screen through which to sort out those cases that do not need to be renegotiated. — L. H. Brown, president, Johns-Manville Corp., June 15 before House Naval Affairs Investigating Committee.

their ordinary lines of production completely disrupted by limitation orders, an Army and Navy largely ignorant of and opposed to the use of gray iron in any form, with but a handful of officials out of the thousands on duty in Washington familiar in any degree with the nature, advantages and limitations of the foundry product, it is not to be wondered at that many predicted a dire future for gray iron. But when the smoke blew away at the end of 1942 it developed that a production of 14,500,000 tons had been absorbed by priority products.

"Those who had predicted a sad end forgot that without machine tools few articles of war are possible; that ingot molds of gray iron, rolls and many other items are needed in the steel mill. Transportation of all kinds, mining, textile machinery, agriculture, housing and, in fact, pretty much all industry must have the product of the foundry in order to move a wheel.

"Today there has been a certain drop in consumption due largely to completion of tooling up for production but the rate indicates a consumption of about 12,000,000 tons in 1943 and probably more from certain expected developments which cannot be discussed at this time.

"The principal fly in the foundry ointment today is manpower. While it is readily understandable that our armed forces must be recruited to such strength necessary to win the war, it is difficult to understand just how they can be kept adequately supplied if only the sick, lame and lazy are left to operate our heavy industries.

"Very recently the Gray Iron Founders' Society brought about a 'round table conference' at which were present a committee of five experienced foundry operators and representatives of the War Production Board, the Office of Price Administration, the War Manpower Commission and the Selective Service System. It was perhaps the first occasion where industry had sat down with these various bureaus or they with each other outside of the confines of Mount Olympus.

"The most evident fact the meeting developed was that those entrusted with producing armed manpower were completely ignorant of what is required of the man behind the man behind the gun. In an impassioned oration the Selective Service representative likened the industrial situation to the women and children passing loaded rifles to their fighting fathers and brothers who manned the stockades on the frontier. Little could he picture actual conditions of the foundry. The high-heeled woman of today bears but little resemblance to the wife of the frontiers—nor man and a loaded rifle to a bull ladle filled with molten iron. It was silly though illuminating. There was no mention of the required medical examinations in industry, the legal restrictions on employment of women in hazardous or heavy occupations in many states, who would pay the damage when women, unaccustomed to hard work or heavy lifting broke down from torn insides, nor the difficulties to be encountered in obtaining proper housing and sanitary equipment to comply with law and common decency.

The new magnesium foundry at Saginaw, Mich., is discussed on page 84 in this issue.

"Again, with wages frozen and all branches of industry crying for manpower, it is natural to suppose that the government-subsidized prime contractor with a higher wage scale and cleaner, cooler surroundings than are possible in a foundry will receive the first call on labor both desirable and undesirable. Regulation, while pretty in theory, cannot prevent the man who wants to move from making himself so obnoxious or costly as to force a release from his employer. This situation is bad and the problem as yet unsolved.

"Turning to the price situation, we find it to be almost on a par in seriousness with that of manpower. A price ceiling established over a period of more than a year ago has reduced the profit margin in an always low profit industry to the vanishing point in many foundries, and the more farsighted and cost-conscious likewise recognize the inevitable trend.

"This is all due to higher costs in many supplies and especially in labor. The output of the unskilled and physically unfit is smaller and inferior, running the scrap losses and rejections up beyond reasonable figures. Labor shortages and absenteeism have advanced the overtime costs to unprecedented figures. Accidents have risen and volume of output dropped so that overtime no longer can be compensated by increased tonnage. The additional clerical labor entailed by government regulations is no mean factor. The Office of Price Administration is well aware of this situation but it is likewise awake to the terrible danger of inflation and must proceed toward any alleviation with extreme caution.

"However, a solution must be found if production is to be maintained and it is a healthy sign that it was possible to bring interested parties together for a frank and friendly discussion.

"As to the future, it is believed that gray iron has proved itself on the industrial battle line. New applications are developing every day and many already developed have not come to common knowledge. There will be many changes when peace returns, in both design and material, but if the ingenuity displayed by the foundryman in adapting himself to changed conditions of the war period is any criterion, the industry can face the future with confidence

Products New to Warfare Give Pressed Steel Prominence Currently

New York

G. E. Whitlock

• • • **The staggering blow** which struck the pressed metal industry and it related supply industries when the declaration of war wiped out both its markets and production materials through the curtailment of civilian items on which the industry depended has been converted to a benevolent spur to action that has brought pressed metal products again to the fore, according to G. E. Whitlock, president of the Pressed Metal Institute and the Mullins Mfg. Co., Salem, Ohio. The entire industry which once existed upon mass production of pressed and stamped parts mainly for civilian luxury articles has been converted to war products which did not exist as such a few years ago.

Most Ordnance items at that time were designed for production by casting, forging or machining which eliminated the pressed metal fabricators until the industry presented the idea that its mass fabricating methods would lower costs, conserve vitally needed machine tool hours and utilize precious manhours that might otherwise be wasted.

Based on this thinking, engineers, designers and production men from the industry cooperating with War Department personnel established a Suggestion and Conversion Branch in the office of the Chief of Ordnance, War Department for the express purpose of redesigning Ordnance parts

for pressed metal production. That this effort has been successful is seen in the record of over 800 parts which this staff has converted to stampings.

Typical of some of these projects is the trigger cover plate for the redesigned Springfield rifle. A former total of 29 machine operations was reduced to 7 non-critical stamping operations. A part described as a suspension guide fitting formerly requiring 3 machined forgings was replaced by Hydrogen-Copper, brazed steel stampings and the cost was reduced from $2.35 per part to 68c. The redesigned cartridge tanks saved enough aluminum in 1½-million units to build 550 bombers plus a saving of 600,000 machine hours according to Pressed Metal Institute figures. Primer cases changed over from brass bar stock to pressed steel are reported to have saved over 23-million lb. of brass during 1943. Another spectacular development has been a pressed steel bulkhead door now being installed in merchant vessels.

The wide-spread interest recently caused by the announcement that several companies had combined efforts to produce and ship quantities of a special sight for the "bazooka" in 20 days—a new sight designed by a soldier under fire in Tunisia which greatly improved the accuracy of this new anti-tank weapon—can be credited to the pressed steel industry. The design was received from Africa, engineered, stamped and delivered by members of this industry in the necessary quantity within 20 days according to government reports of the case.

The newly formed Pressed Metal Institute, first organized last March, will now take over much of the responsibility for the future planning and governmental collaboration of the industry. Difficulties presented by getting war-time executives of the trade together has made it impossible for the institute to entertain a national meeting of its members, but regional meetings are planned to convey essential information to and from the industry. Post-war planning will also be handled through the Institute, Mr. Whitlock said.

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Transportation Breakdown Held to Be Imminent Unless Roads Get More Steel

Cleveland

• • • **Unless the railroads are granted** the allocations which the Office of Defense Transportation has requested and which have been whittled down more than half by WPB "there is no doubt that a breakdown in the transportation machine will result," according to the Great Lakes Regional Advisory Board at an interim meeting here June 30. In a letter which the board voted to send WPB, it was reported to be the membership's unanimous belief that the ODT figures represent minimum requirements.

The equipment requested included 900 locomotives, 80,000 freight cars and 2,100,000 tons of rails and accessories. WPB has allocated 269 locomotives and 25,000 freight cars and has cut the rail request by nearly half.

Allen Dean of the Detroit Board of Commerce, chairman of the car efficiency committee, told the meeting that if the railroads had not been efficient, the "mother instinct" would doubtless have caused the government to provide more equipment. He characterized the present attitude of the government in respect to equipment as adamant. The equipment crisis, it was said, will come to a head this Fall and Winter.

Estimated iron and steel carloadings in the board's territory (lower Michigan, northern Indiana, northern Ohio, western New York and northwestern Pennsylvania) for the third quarter of 1943 show a decrease of 6.0 per cent from third quarter 1942 shipments, and a slight increase over those for the second quarter of this year, K. A. Moore, of the automotive

An Experience in Handling Unwarranted Absenteeism

I have read many of the experiences executives have had with absenteeism and how they attempted to solve the problem, and I have tried many suggestions coming from experts. I have listened to suggestions from the shop foremen and have even called the union committee in on a management-labor conference.

"Patting-on-the-back" methods failed from the start. Disciplinary measures are not advisable due to repercussions which often come from delicate cases where it is difficult to determine the real cause of a man's absence.

The highest percentage of absenteeism develops immediately after the worker receives his pay, which in our case is on the Friday night shift, Saturday and some on Monday. Despite laying off offenders from two to six days, no improvement resulted from reprimands. On the contrary, the reprimanded men got "sour," and received a lot of sympathy from their co-workers as well.

On Friday the night men can have their checks beginning at 10 a. m., giving them time to do their weekly shopping in daytime.

To break the habitual absentees from their practice of staying away either on Friday night or Saturday, I decided to change the payday to Saturday and notified the union committeemen, who approved and promised to cooperate. It should be understood that the unions do not approve of wildcat absenteeism and, if properly handled, will cooperate in combatting this evil. Incidentally, ours is an open shop with union agreement. We have about 240 employees.

The decision was made on a Tuesday and notices were posted that payday had been changed to Saturday. The reaction started to set in on Thursday, when a number of loyal and steady workers came to ask if they couldn't be paid as heretofore on Friday, why should they be penalized for the sins of a few reckless co-workers, and so on.

By Friday morning the psychological cycle was complete. The most astounding reaction had crystallized: The absentees were condemned and rebuffed by their own co-workers!

Neither the management nor the unions could ever have accomplished such a unanimous judgment.

The rest was easy. The payroll department had orders from the outset to have paychecks ready on Friday as usual and the paymaster was to hand the checks to all except the habitual absentees, whose checks were to be delivered to me. The delinquents were to call for their pay at my office.

Thus, when the paymaster started his rounds of paying off, he naturally skipped the culprits, whereupon the big rumpus all over the departments started. Jibing, poking fun and general provoking of the checkless men was ceaseless until the end of the dayshift, when the disciplined men charged into my office, one by one, ready to strike back. I was ready for them, however. As soon as one of them stepped in I handed him his check, asking if that was what he wanted. I told him to look at the figures on the check. Did he realize that his check would have been for a considerably larger amount if he had not been foolish enough to loaf rather than work and do his share toward the war effort, like the rest of us.

These men didn't let off steam on account of being ridiculed, after all. Instead, I gave them some friendly and sound advice, handed them their checks, and—neither Friday, Saturday nor Monday had we any unwarranted absentees. We are continuing this method of handling absenteeism. — *By John Sonnenfeld, Vice-President and Works Manager, Keokuk Steel Casting Co.*

council for war production, told the meeting. The decrease is accounted for by fuller loading of cars, actual tonnage having increased.

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Cleveland

••• **Ore shipments** amounting to 4 million tons a week are a definite possibility later this season, members of the Great Lakes Advisory Board, meeting here June 30, were told by W. J. McGarry, manager of ore and coal exchange. Shipments at present are just under 3 million tons a week, due principally to bad weather. An average of somewhat more than 3 million tons a week for the remaining 22 weeks of navigation is necessary if the 91 million-ton ore directive is to be fulfilled. "With any kind of a break, the directive should be reached," said Mr. McGarry, pointing out that another of the Maritime Commission super-carriers is going into commission this week, three in August and three more in September.

Mr. McGarry took a slap at the government's request for 600 million tons of coal in 1943, pointing out that of the 580 million tons shipped in 1942, 50 million went into storage. "Only if Washington keeps shipments of coal down to actual requirements will the railroads have enough open cars," he said.

Production for Sale 27,781,209 Tons In May

Source: American Iron and Steel Institute

		Number of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons							
					Current Month				Year to Date			
					Total	Per cent of capacity	Shipments Export *	Shipments To members of the industry for conversion into further finished products	Total	Per Cent of capacity	Shipments Export *	Shipments To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	44	1	xxxxxxx	722,478	xxx		207,008	3,390,017	xxx		985,844
	Heavy structural shapes	10	2	5,412,580	320,010	69.6		xxxxxxx	1,606,698	71.7		xxxxxxx
	Steel piling	3	3	338,000	3,938	13.7		xxxxxxx	9,404	6.7		xxxxxxx
	Plates—Sheared and Universal	21	4	9,189,740	1,067,858	136.8		2,273	5,395,835	141.9		17,211
	Skelp	6	5	xxxxxxx	70,371	xxx		37,920	335,591	xxx		177,701
	Rails—Standard (over 60 lbs.)	4	6	3,629,260	136,443	44.3		xxxxxxx	747,580	49.8		xxxxxxx
	Light (60 lbs. and under)	6	7	309,690	16,363	62.2		xxxxxxx	66,516	51.9		xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	102,000	1,288	14.9		xxxxxxx	11,866	28.1		xxxxxxx
	Splice bar and tie plates	13	9	1,120,270	52,652	55.3		xxxxxxx	271,882	58.6		xxxxxxx
	Bars—Merchant	40	10	xxxxxxx	592,267	xxx		91,380	2,978,341	xxx		391,958
	Concrete reinforcing—New billet	15	11	xxxxxxx	25,379	xxx		xxxxxxx	172,838	xxx		xxxxxxx
	Rerolling	16	12	xxxxxxx	7,258	xxx		xxxxxxx	37,473	xxx		xxxxxxx
	Cold finished—Carbon	23	13	xxxxxxx	148,761	xxx		xxxxxxx	732,023	xxx		xxxxxxx
	Alloy—Hot rolled	20	14	xxxxxxx	270,336	xxx		37,324	1,260,625	xxx		191,488
	Cold finished	18	15	xxxxxxx	40,774	xxx		xxxxxxx	196,435	xxx		xxxxxxx
	Hoops and baling bands	4	16	xxxxxxx	9,938	xxx		xxxxxxx	39,097	xxx		xxxxxxx
	TOTAL BARS	63	17	14,706,525	1,094,713	87.6		128,704	5,416,832	89.0		583,446
	Tool steel bars (rolled and forged)	17	18	200,840	20,568	120.5		xxxxxxx	100,556	121.0		xxxxxxx
	Pipe and tube—B. W.	15	19	2,236,040	109,085	57.4		xxxxxxx	545,501	58.9		xxxxxxx
	L. W.	8	20	845,400	41,723	58.1		xxxxxxx	235,049	67.2		xxxxxxx
	Electric weld	7	21	1,149,250	95,820	98.1		xxxxxxx	424,103	89.2		xxxxxxx
	Seamless	15	22	3,082,400	182,261	69.6		xxxxxxx	892,620	70.0		xxxxxxx
	Conduit	7	23	190,000	5,185	32.1		xxxxxxx	26,071	33.2		xxxxxxx
	Mechanical Tubing	11	24	597,800	64,023	126.1		xxxxxxx	312,103	126.1		xxxxxxx
	Wire rods	21	25	xxxxxxx	99,037	xxx		16,792	495,605	xxx		99,167
	Wire—Drawn	41	26	2,366,150	158,073	78.6		4,982	814,614	83.2		23,910
	Nails and staples	19	27	1,116,640	67,442	71.1		xxxxxxx	357,021	77.3		xxxxxxx
	Barbed and twisted	15	28	482,280	21,831	53.3		xxxxxxx	101,025	50.6		xxxxxxx
	Woven wire fence	16	29	778,060	20,202	30.6		xxxxxxx	84,952	26.4		xxxxxxx
	Bale ties	12	30	128,420	9,745	89.3		xxxxxxx	45,081	84.8		xxxxxxx
	All other wire products	8	31	78,220	4,894	73.6		xxxxxxx	26,049	80.5		xxxxxxx
	Fence posts	11	32	125,065	2,253	21.2		xxxxxxx	8,975	17.3		xxxxxxx
	Black plate	10	33	339,700	25,752	89.2		-	120,136	85.4		-
	Tin plate—Hot rolled	5	34	508,620	1,215	2.8		xxxxxxx	8,168	3.9		xxxxxxx
	Cold reduced	10	35	3,816,340	201,701	62.2		xxxxxxx	857,652	54.3		xxxxxxx
	Sheets—Hot rolled	25	36	xxxxxxx	478,119	xxx		17,977	2,542,729	xxx		80,357
	Galvanized	14	37	xxxxxxx	62,524	xxx		xxxxxxx	337,130	xxx		xxxxxxx
	Cold rolled	14	38	xxxxxxx	115,381	xxx		xxxxxxx	613,736	xxx		xxxxxxx
	All other	14	39	xxxxxxx	27,603	xxx		xxxxxxx	151,076	xxx		xxxxxxx
	TOTAL SHEETS	28	40	13,497,570	683,627	59.6		17,977	3,644,671	65.2		80,357
	Strip—Hot rolled	22	41	3,200,890	125,814	46.3		14,737	644,353	48.6		71,136
	Cold rolled	39	42	2,057,340	96,791	55.4		xxxxxxx	470,703	55.3		xxxxxxx
	Wheels (car, rolled steel)	5	43	428,880	20,062	55.6		xxxxxxx	94,287	53.6		xxxxxxx
	Axles	6	44	453,470	13,875	36.0		xxxxxxx	70,105	37.4		xxxxxxx
	Track spikes	11	45	308,350	12,369	47.2		xxxxxxx	63,620	49.9		xxxxxxx
	All other	5	46	42,000	16,985	476.0		xxxxxxx	85,968	494.6		xxxxxxx
	TOTAL STEEL PRODUCTS	159	47	xxxxxxx	5,586,447	xxx		430,393	27,781,209	xxx		2,038,772
Import Products	Pig iron, ferro manganese and spiegel	26	48	xxxxxxx	777,239	xxx		373,197	3,154,583	xxx		786,746
	Ingot moulds	5	49	xxxxxxx	84,474	xxx		xxxxxxx	400,216	xxx		xxxxxxx
	Bars	10	50	170,110	7,773	53.8		72	41,247	58.6		1,381
	Pipe and tubes	2	51	106,000	6,100	67.7		xxxxxxx	37,277	85.0		xxxxxxx
	All other	1	52	56,000	838	17.6		-	6,622	28.6		-
	TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	xxxxxxx	14,711	xxx		72	85,146	xxx		1,381

Total number of companies included, 183.
During 1942, the companies included above represented 98.8% of the total output of finished rolled products.

* In accordance with Government policy, export figures cannot be published.

Bill For Termination of War Contracts Is Turned Over to Special Committee

Washington

• • • **The War Department bill** for termination of war contracts has been taken under study by a Special Investigating Committee headed by Representative Durham of North Carolina. A report on the measure will be made to the House Committee on Military Affairs for legislative action. The report will not be made until after Congress convenes following recess, which is expected to be taken soon.

Designed to speed up termination of contracts after the war, the bill was considered by the Military Affairs Committee which directed the Durham Committee to study the measure along with its consideration of termination of war contracts which has been under way for several weeks.

The bill would authorize the War Department, the Navy Department, the Maritime Commission and the Procurement Division of the Treasury Department to make loans as advances against full payments, and to purchase terminated subcontracts during the period of settlements. These would range from several months to years depending upon the size of the contracts and the number to be settled. The advances would be made in order that contractors might have capital for reconversion to peace operations. This authority was put in the bill after it had been revised. It was stated that the War Department has some 25,000 prime contracts outstanding, while the total, including subcontracts, is approximately 150,000.

The bill was modified after Gerald D. Morgan, legislative counsel analyzed the original measure, which, it was held, raised serious questions regarding its scope and the propriety of using funds appropriated to build tanks and planes for payment of termination damages. Controller Lindsay C. Warren, who had been asked to testify on the bill, wrote the Chairman May of the Military Affairs Committee that it was "do startling in its scope" that he wanted time to prepare a considered opinion about the bill.

When testifying on renegotiation of contracts before the House Committee on Naval Affairs, Undersecretary of War Robert P. Patterson, was asked by Representative Maas of Minnesota whether by depriving contractors of adequate reserves, he was trying to establish "a post-war WPA for corporations."

Little Shortage of Supervisory Help Reported; Foremen Upgraded

Pittsburgh

• • • **While there have** been shortages of supervisory material in the steel industry at various times throughout the war period, no serious problem has developed in the line organizations owing to the efficiency of foreman training courses. As men have been trained and upgraded for supervisory positions, management has been fortunate in finding that many of these employees had far more supervisory qualities than would have been expected.

The heavy drain on employees due to Armed force inductions has forced the up-grading and training of a substantial number of employees who under normal conditions, may not have had "a break." Proof that the training programs in the steel industry as well as the promoting of supervisory employees have shown up to a greater advantage than would have been expected, is indicated by the unprecedented number of broken records as well as the handling of tremendous paper work required by Washington regulations.

Personnel departments in various steel companies have out-done themselves in the matter of training in classes, by films and slides, and by actual training on the job.

It is said that Carnegie-Illinois Steel Corp. alone has trained more than 15,000 employees for supervisory positions during the war period and claims that 65 per cent of the total employee force have had some type of training or other.

Other steel companies report similar experiences; and were it not for this concentration on training, the supervisory problem on new steel expansion projects would have been of a far more serious nature. As the matter now shapes up, the man power problem on new steel expansion projects is one of obtaining a sufficient number of employees to run the plant rather than securing the necessary supervision. This, of course, does not mean that steel companies have had no difficulties in obtaining and training supervisory material.

"PONTOON TOW" BRIDGE: Just off the ways of the Odenbach Shipbuilding Corp., Greece, N. Y., this army tanker sails past a unique pontoon bridge. The shipyards are built 1800 ft. inland, so engineers dredged a nearby pond to provide an exit channel. An easily moved bridge was necessary because a main road carried across the new canal. The bridge, 65 ft. long and 22 ft. wide, has four lifting pontoons, and is surfaced with standard Irving open-mesh steel decking, and can be towed aside by a crew of two men.

COMING EVENTS

Oct. 13 to 16—The Electrochemical Society, Inc., New York.

Oct. 18 to 22—National Metal Congress and Exposition, Chicago

Oct. 28, 29—American Institute of Mining Engineers and American Society of Mechanical Engineers, Pittsburgh.

Strikes Continue Despite New Law

New York

• • • **Even with legislation** supposedly controlling strikes the following have been reported during the last week to THE IRON AGE:

In Detroit 2200 UAW members walked out for one shift over disciplinary action against a shop steward.

A one-day strike hit the Western Cartridge Co. at East Alton, Ill. About 1350 machinists walked out when five women were hired at 6c. an hour less than the scale paid men for the same work.

Three strikes hit New Jersey. About 1000 workers walked out of the Crucible Steel Co. of America's plant at Harrison, N. J., without giving reason. The company reported that the men returned the next day under a truce. At Trenton, N. J., about one-third of the workers of John A. Roebling's Sons walked off the job last Wednesday. Nearly all of the 1500 men returned to work the following day. General dissatisfaction was given as the cause. In Bayonne, N. J., about 100 workers of the Dodge & Olcott Co. struck last Monday and had not returned at week end. The walkout was allegedly caused by refusal of WLB to grant payment of an 8½ week bonus.

In New York, 250 of 1000 longshoremen at six piers of the Maritime Commission struck for two days last week charging discrimination against New Jersey stevedores in favor of New York workers.

New Form Issued for Share-the-Steel Plan

• • • **A new form,** known as WPB-3028, was distributed throughout the industry last week for use in connection with the new "share the steel" drive. It is a report of over-all steel inventory and consumption for the period fom July through December. Note that this form is in no way related to Form WPB-3029 also recently issued but for the purpose of returning unused allotments of controlled materials.

WPB offers the following suggestions and clarifications to assist in filling out WPB-3028:

(A) Separate reports must be made for carbon and alloy steel.
(B) Separate reports must be made for each claimant agency carrying authorized programs with the consumer.
(C) A separate report must be made covering all B product production.
(D) Report is to be made to show net product tons, as dollar volume is wholly inadequate.
(E) Form need not be executed for each CMP product classification. Use back of report for reporting additional information.

What column headings mean:

To be put into production. This column is to be filled in to show the net tons required to fulfill CMP authorized schedules for each month beginning with July and ending with December, 1943.

Present Rate of Use. Show present rate of fabrication per month, in net tons of material consumed. This need only be stated as one figure, and need not be projected for the entire six months.

Total Use Capacity. Show in one figure for each month net tons of material that could be consumed at full operations. This need not be shown for each claimant agency and B products programs, but should be give as a total for all operations.

Total Use (Last 3 Mos.) Available. Show net tons of steel fabricated during the period stated. It should be reported for each claimant agency and B product authorized programs.

Inventory Unfabricated and In Transit. Show the net tons of material (unfabricated) in hand, and the net tons of material in transit from the producer to the consumer. Only one entry necessary. CMP Regulation No. 2, Interpretation No. 1, June 19, 1943.

Material in Process. It is believed that statistical information will not be available in all cases, it therefore becomes necessary to secure the best estimate available. The figure must be given in net tons of raw material as it enters the fabrication lines. CMP Regulation No. 2, Interpretation No. 1, dated June 19, 1943.

CMP Orders Submitted to Producers and Accepted. Show net tons submitted and accepted by the producer for shipment during each month.

CMP Orders Submitted to Producers Unaccepted. Report same as Column H except that it must show the net tons of orders actually requested for shipment each month and refused by a producer for any reason.

Unallotted Balance. Show net tons of allotments that have never been submitted to any producer.

Remarks. Note here arrangements that have been made with the consumer to cancel either orders (CMP validated) with the producers, or cancellation of unplaced allotments.

The form should be filled out in quadruplicate.

Jones & Laughlin Men Given Pay Raise

Pittsburgh

• • • **Wage advances** of 4½c. an hour, retroactive to Aug. 29, 1942, were granted by the regional War Labor Board at Philadelphia this week to 300 riggers, painters and helpers at the Southside plant of Jones & Laughlin Steel Corp., Pittsburgh. The increases establish an hourly rate of $1.02½ whereas the CIO-USWA asked for $1.11½. The riggers struck in May in protest against the smaller boost, but the strike was ended when federal conciliators interceded.

Payrolls Set Mark In Steel During May

• • • **Payrolls of the steel industry set a new high mark of $137,404,000 in May, comparing with a previous peak of $136,813,000 in March, 1943, according to the American Iron and Steel Institute. Employees numbered 632,000 in May, against 634,000 in April and 656,000 in May, 1942. Hourly earnings of wage-earners were at a new high of 113.4c. in May, with the work week averaging 41.9 hours.**

Steel Corporation Production At 100% for Two Years

Chicago

• • • **For more than two years** the finished steel production of U. S. Steel Corp. has averaged in excess of 100 per cent of rated capacity in an effort to meet war demands for steel, Irving S. Olds, chairman of the steel company, reported here last week at a meeting of prominent executives of Chicago which was featured by a showing of the film "To Each Other." The film details the war-time activities of the corporation.

Superior Ore Shipments Down 6% from June, 1942

Cleveland

• • • **Shipments** of Lake Superior ore from Upper Lake Ports amounted to 11,864,401 tons in June, a decrease of 6 per cent from last year's June shipments, according to the Lake Superior Iron Ore Association. Shipments for the season so far total 24,793,890 tons, a decrease of 27 per cent from last year's 33,952,166-ton total at this time.

1943 Merchant Ship Delivery Totals 879; Tops '42 Output

• • • **Merchant shipyards** delivered 168 vessels totaling 1,675,500 deadweight tons in June. The May total was 175 ships.

The Maritime Commission, in reporting June output, said it brought the total production for the first half of 1943 to 879 ships aggregating 8,818,622 deadweight tons. This exceeded production for the entire year of 1942.

War Machine Is Not Over-Supplied Now, Say Henderson and Cherne

New York

• • • **America's war machine,** in general, is not over-supplied now, although there are some limited areas of over-supply, such as in shells, according to Leon Henderson and Leo M. Cherne, of the Research Institute of America, in a joint statement issued July 1 after considerable study of the question.

The economists said they expect production demands will continue to change, increasing in momentum at the end of six to nine months. War procurement will show little, if any, let up for the full 12 months ahead, barring a sudden collapse of Germany, a factor not contemplated in present procurement plans.

Reasons for continued production pressure were cited as including: Troops not equipped; Allied requirements growing; demand for 400 million dollars worth of used machinery from Mexico; reoccupation needs; the easing of ocean transportation. The needs of reoccupation and rehabilitation, calling for a type of production different than munitions making, have not been fully appreciated, said Henderson and Cherne.

Henderson stated that as the tapering-off period in Army needs begins, the question of how the nation moves into reconversion will be exceedingly important and the OWM and WPB should play important parts in settling disputes. There is need now for determination of who will receive the first material which will be released for semi-military equipment, he added.

For the next six months there is no possibility of alleviation of the manpower shortage. On the contrary, the several million withdrawals still required through the draft machinery will aggravate this shortage. After six months there is the possibility of an ironic development. Increasing efficiency in production, the lengthening of hours, the beginnings of cutdowns on some capital munitions items and the specialized nature of some of the reoccupation equipment will cause local unemployment.

It was said some war plants are certain to end their schedules before the middle of 1944. The study shows, however, that little, if any, of the scarce metals and other critical materials will be available for a resumption of civilian manufacture in those plants.

Henderson and Cherne advise industrialists to "make a distinction in your business operations among several periods. The short term period is the one in which you are operating on your present war contract or sub-contract. The War Department's production program for next year ought to be presented to the President in about a month. Its magnitude will then be known, and in some cases the specific articles for which the War Department will prepare procurement programs will be designated.

"Check constantly with your procurement official or prime contractor about the possibilities of renewal of your present contract. Then assume that either your present contract or its successor will be terminated. Determine—as soon as your procurement officer is equipped to tell you—whether the specific arms or supply on which you are now working can be followed up by a contract for any reoccupation equipment."

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Technical Changes to CMP Affect Steel

Washington

• • • **Several technical** changes in regulations and orders affecting the steel industry were announced last week by the War Production Board.

These actions are as follows:

1. Order M-21-c, which scheduled steel plate production, was revoked, its function now being supplanted by the Controlled Materials Plan.

2. Order M-21-d, covering corrosion and heat resistant chrome steel, was amended to permit the use of stainless steel on authorized controlled material orders. Previously, the use of stainless steel was permitted only on AA-5 or higher rated orders.

3. An interpretation of Priorities Regulation No. 1 makes it clear that production directives are not to be interfered with by rated orders for the use of facilities.

4. Steel mills may not establish consigned stocks in the plants of their customers under the permission granted in Direction 15 to CMP Reg. No. 1 for the maintenance of mill stocks. This is stipulated in an amendment to the Direction, issued because the original Direction has been too broadly interpreted by certain mills.

5. Because of restrictions on shipping, customers ordering steel for exports often are unable to furnish delivery instructions at the time orders are placed. Therefore, the requirement that full delivery details be furnished when export orders are placed is waived in the case of Lend-Lease and Board of Economic Warfare orders by Direction No. 20 to CMP Reg. No. 1.

Trade Notes

Alexite Engineering Co. have moved their New York office to 500 Fifth Avenue.

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General Electric Co. has formed a new division of the Appliance & Merchandise Department. The new division will be known as the Resin and Insulation Materials Division, and E. L. Feininger will be manager.

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Bell Aircraft Corp.'s Washington address has been changed to 1025 Connecticut Ave., Washington 6, D. C.

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H. K. Porter Co., Inc., Pittsburgh, has bought the Quimby Pump Co., Newark, N. J.

•

Sims Matchplate Co. has moved to 2176 Erie Boulevard, East Syracuse 3, N. Y.

•

Johnson Bronze Co., New Castle, Pa., has acquired plants of the Somerville Iron Works at Somerville, N. J., and Chattanooga, Tenn.

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Quebec Shipyards, Ltd., a government owned company, has been formed to coordinate shipbuilding activities of Morton Engineering & Dry Dock Co., Ltd., Quebec; George T. Davie & Sons, Ltd., Lauzon; and the shipbuilding division of Anglo-Canadian Pulp & Paper Mills, Ltd.

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C. T. Hansen & Co. has been appointed Pacific Coast sales representative for Lukens Steel Co. and subsidiaries. Offices have been opened at 530 West Sixth Street, Los Angeles; 235 Montgomery Street, San Francisco; and 1319 Second Avenue, Seattle.

Many Rail Accessories Named to B Product List

Washington

• • • **Beginning with the fourth** quarter, gage rods, mine ties, clip bolts, rail clips and nut locks will be classified as B products and will be under the jurisdiction of the WPB industry divisions indicated below:

Gage rods and rail clips—Transportation Equipment Division

Nut locks and clip bolts—Building Materials Division

Mine ties — Mining Equipment Division

Producers of these products should file Application for Allotment Forms CMP-4-B with the industry divisions indicated setting forth their controlled materials requirements for the fourth quarter of 1943 and the first and second quarters of 1944. Such applications should be submitted at the earliest possible date.

Producers May Reject Orders That Conflict With Normal Mill Practice

Washington

• • • **Circumstances under which** a seller may reject rated purchase orders which do not meet his regularly established terms of sales have been clarified by the WPB. The interpretation will permit sellers to follow normal business practice, under certain conditions. Rated orders may be rejected for the following reasons:

1. Where a rated order calls for quantities which are less than the minimum which a person regularly sells. For example, a manufacturer who has been selling only in carload lots may reject a rated order for less than a carload lot.

2. Where a person regularly sells only to certain types of trade purchasers, such as wholesalers, jobbers, or retailers, he may reject orders from other types of purchasers, but only if the merchandise can be obtained in the required quantity through regular trade channels.

3. Where a manufacturer or wholesaler has an exclusive distributer, either for all sales or for a particular territory, he may reject rated orders from other purchasers, provided the exclusive distributer is in a position to fill the orders promptly.

These provisions, which are contained in Interpretation 3 to Priorities Regulation No. 1, clarify exceptions to the rule that a vendor must sell his product to any person who presents him with a rated order.

Casting Capacity Held for Emergencies

Washington

• • • **To provide a supply** of steel castings to meet the demands of emergency orders for maintenance, repair and operating supplies, MRO Emergency Load Directives to producers of steel castings, reserving a percentage of their expected monthly production to fill such orders, have been established by the Steel Division.

Producers are to reserve the percentage set in each case to fill authorized controlled material orders bearing the allotment symbol "MRO," but such space in monthly schedules is to be reserved for this purpose only up to the lead time date specified for the steel castings in Schedule III of CMP Regulation No. 1. After that date the reserved space is to be used to fill any authorized controlled material order placed in accordance with CMP Regulations.

The directives establish the maximum percentages of monthly production of steel castings which may be reserved for MRO orders. If such orders are received after the reserved space has been filled they are to be treated as any other authorized controlled material order.

Higher Prices Set To Aid Fluorspar

Washington

• • • **General increases** of approximately $5 a ton in the maximum prices for all grades of fluorspar—designed to assist WPB in its program to boost production and at the same time compensate producers for wage increases resently approved by NLB—were announced last week by OPA.

The new higher ceiling prices are authorized in Revised Maximum Price Regulation No. 126 and are effective July 1.

Of the $5 increase in maximum prices, approximately $3.50 is authorized to permit absorption of higher wage costs by producers. The remaining $1.50 is granted to stimulate production and development of new fields as desired by WPB.

Metallurgical grades of fluorspar are given new maximum prices of $30 to $33 a ton, depending upon the grade sold, compared with $25 to $28 previously.

To encourage the production and sale of low grade metallurgical fluorspar, these new prices are to be effective only for a period of 60 days from the effective date of the regulation. After the 60-day period, the prices for higher grades of metallurgical fluorspar, that is, fluorspar with an effective CaF_2 (Calcium fluoride) content in excess of 60 per cent, may be charged only on sales approved by WPB.

The new ceiling prices for acid and ceramic grades of fluorspar are $37 a ton, with adjustments for freight differentials.

Switch Gear Simplified; Use of Steel, Copper Limited

Washington

• • • **WPB has ordered** strict conservation of critical materials and simplification of types in the manufacture of power switch gear. Schedule IV to L-154, issued last week will permit an estimated saving of more than 3000 tons of carbon steel and 2,000,000 lb. of copper annually in the manufacture of power switch gear, according to WPB.

Important steps in the conservation program are:

1. Operating all copper current carrying parts at higher current densities than those previously accepted as standard by the industry.
2. Eliminating many portions of steel enclosures and reducing the gage of steel in others.
3. Substituting wood or other materials for structural steel in the fabrication of outdoor substation structures.
4. Eliminating duplicate connections, unnecessary hardware and non-essential instruments.

New Ruling Issued On Steel for Export

Washington

• • • **Steel produced** and ready for export shipment prior to July 1 on purchase orders bearing preference ratings granted by BEW may be shipped without requiring that such orders be validated as authorized controlled material orders, WPB notified all export steel producers July 1.

On the other hand, WPB said, if the material has not been produced prior to July 1, the producer must ask the exporter to apply to BEW for a CMP allotment number.

Under CMP it is the general rule that a producer may not ship steel after June 30 except on an authorized control material order. The direction was issued, however, because in the case of steel for export to Latin America and other countries it sometimes happened that steel was produced on a preference rating basis and ready for shipment before July 1, but that shipment was held up pending ODT permit or other clearances.

Lend-Lease Specifications to Be Modified to Meet American Standards

Washington

• • • **Lend-Lease requisitions** calling for off-standard specifications will be revised wherever practicable to conform with simplified and standdardized American specifications, it was announced recently. Lags in production caused by time-consuming conversion of machinery to meet off-standard specifications will thus be eliminated.

The Conservation Division of the War Production Board, working with the WPB industry divisions and the Office of Lend-Lease Administration, is responsible for reviewing daily all requisitions and recommending changes. Unless a foreign government can prove to the satisfaction of the Lend-Lease Administration that standard American specifications will not perform the necessary functions, its requisition for equipment or raw materials will be revised to standard American specifications.

Requisitions which have recently been revised give evidence of benefits derived from this procedure. Requests for nuts and bolts were revised to call for standard American threads. The continuance of this practice will reduce the need for carrying many off-standard inventories. The changing of metric thread to standard iron pipe specifications saves man-hours of labor otherwise required for retooling. Specifications for electric loading trucks have been changed to comply with American schedules which were recently simplified by reducing models from 221 to 50. Requisitions for nylon type paint brushes have been replaced by requisitions for types permitted in American simplified schedules, thereby releasing nylon for more vital needs such as for the production of parachutes. In the case of off-standard electric light bulbs replaced by our standard types, industry was relieved of the necessity of changeover which would otherwise have been required. Approximately 79 tons of steel were saved in one requisition in which low grade plywood was substituted for galvanized sheet steel to be used for the construction of temporary barracks.

Expedited foreign deliveries as well as increased production will result from such greater adherence to American standards. It is expected that as this practice becomes more widespread, the foreign purchasing commissions will call for standard American specifications in their requisitions, thereby releasing man-hours of labor, critical materials and machine changeover time to the over-all war effort.

Allotments Can Be Changed on Orders

Washington

• • • **WPB announced last Thursday** that one allotment number may be substituted for another on an authorized controlled material order, without changing the position of the order in the mill schedule.

In such a case, the order will be treated just as though it bore the substituted allotment number when the order was originally placed, according to Interpretation No. 10 to CMP Regulation No. 1. It is pointed out that if at the time the allotment symbol is substituted the order itself is otherwise materially changed, the order is to be treated as a new order. Changes which would constitute a new order include the following: (1) a change in the form or shape of the product ordered, (2) advancing the delivery date, or (3) an increase in the quantity ordered.

Steel Limited in Some Power Boilers

Washington

• • • **Issued last Thursday** by WPB, Order L-299 provides that power boilers, except those for locomotive or marine service, may not have a greater metal thickness or quantity of steel than needed to meet the minimum thickness requirements of the ASME boiler construction code. Boilers affected are those for a design pressure exceeding 15 lb. per sq. in. The restrictions do not apply to boilers in process on July 1 or those into which a tube is rolled.

Tin Plate for Cans May Be Held at Mills

Washington

• • • **Tin plate for can** manufacturers may be made in advance and held at steel mills for later shipment as directed by the can manufacturer, the War Production Board said last week.

This procedure, customary because of the seasonal nature of the canning industry, is permitted by Direction No. 19 to CMP Regulation No. 1. The direction applies to all producers of tin plate, short ternes, and tin mill black plate.

Strains and Stresses - "Women Heat Treaters"

MADAM! FOR THE 66TH TIME, IT ISN'T NECESSARY TO DUST THE FURNACE EVERY MORNING!
QUICK, ELLA! POWDER UP.... HERE COMES THAT CUTE STEEL SALESMAN!
POWDER ROOM
YOU BRUTE! I SWEAT OVER A HOT FURNACE ALL DAY, AND YOU REFUSE TO DRIVE ME HOME!
BOSS, WILL YOU GIVE THIS DIE TO AGNES AT THE DRAW FURNACE....WE'RE NOT SPEAKING SINCE THE COMPANY BRIDGE GAME LAST NIGHT!
I DID EVERYTHING RIGHT, BOSS, BUT I KEEP FORGETTING TO LIGHT THE FURNACE!
WELL! AT LEAST THE BOSS CAN EXPLAIN THOSE BLONDE HAIRS ON HIS COAT MORE CONVINCINGLY TO THE LITTLE WOMAN NOW!
HEY, BENNY, WILL YA TELL MRS. NEWLYWED THAT SHE CAN'T ANNEAL HER HOMEMADE BISCUITS IN MY BOX FURNACE!
BOSS, I MUST HAVE MY CLOCK NUMBER CHANGED TO 187 TO CORRESPOND WITH MY HOROSCOPE READING!

Component Lack Delaying Mine Equipment

Washington

• • • **Manufacturers of mining machinery** are not meeting their schedules of production because of difficulties in getting component parts, it was revealed last week at a meeting of the WPB Mining Equipment Industry Advisory Committee. Production schedules have been frozen 90 days ahead and no changes in the order of production approved by WPB will be permitted in any month.

Some members of the industry also cited labor shortages as well as the component difficulties as interfering with the processing of repair jobs. Discussion revealed that no appreciable difficulties are being experienced in obtaining materials.

Production Directives to Rule Rail Anchor Making

Washington

• • • **Producers of rail anchors** will continue to operate under production directives during the third quarter of 1943 and will obtain their production requirements for that quarter as they have in the past, the WPB Steel Division announced last week.

Beginning with the fourth quarter of 1943 producers of rail anchors will operate under CMP Regulation No. 8 and must obtain their controlled materials requirements, previously allocated to them, by submitting Form CMP-4B to the Steel Division. In filing this application, controlled materials requirements should be indicated for the fourth quarter of 1943 and the first and second quarters of 1944.

The Steel Division will process these applications and allotments will be issued for the fourth quarter of 1943 and the first and second quarters of 1944. This will make it possible for producers of rail anchors to place advance orders for all requirements of controlled materials and with any producers they elect and in sufficient time to secure acceptance of orders for delivery in the months required.

WPB Appointment

Washington

• • • **Appointment of Howard H.** Frank as Deputy Director of the Safety and Technical Equipment Division was announced today by John J. Hall, Deputy Vice Chairman for Industry Operations.

Priority Changes

L-144—Amended order restricts the delivery of any one item or quantity of the same item of laboratory equipment having a value of $50 or more, or the delivery on a purchase order of laboratory equipment worth $200 or more, unless authorized by WPB. (6-28-43)

•

L-299—Order provides for conservation of the use of steel in the manufacture of heavy duty steam boilers. (7-1-43)

•

M-161—Schedule A, as amended, waives inventory restrictions on lead, so that this mineral may be moved from production and existing stockpiles into consumer channels in larger quantity. (6-29-43)

•

P-43—Amended order assigns preference ratings and an allotment symbol to laboratories to assist them in obtaining all materials and equipment needed to carry on scientific or technological activities. (6-28-43)

Warehouse Premiums Set on Ferrochrome

Washington

• • • **A schedule of premiums** of differentials which independent warehousemen may charge in sales of ferrochromium and chromium metal was announced by the OPA.

The premiums are provided in Amendment No. 1 to Maximum Price Regulation No. 407, and became effective July 1.

The amendment provides that maximum prices at which independent warehousemen may sell ferrochromium or chromium metal shall be the producers' maximum prices to the warehousemen plus 10 per cent for quantities of 500 lb. and over, 15 per cent for amounts of 100 to 500 lb., and 20 per cent for amounts less than 100 lb.

Amendment No. 1 also provides a premium of 1½c. per lb. on carload lot sales of chromium metal in the Central Zone, and 2¾c. per lb. in the Western Zone.

Price Briefs

• Amendment 1 to Max. Price Reg. 407 provides a schedule of premiums or differentials which independent warehousemen may charge in sales of ferrochromium and chromium metal. (Release No. TCS-197)

•

• Max. Price Reg. 136, as amended, lists specifically industrial floor surfacing and floor maintenance machinery as an item covered by the regulation. (Release No. TCS-253)

MRO Records Asked Based on Supplies

Washington

• • • **Records of maintenance,** repair and operating supplies may be kept on the basis of supplies received, rather than the amounts ordered in any quarter, WPB has announced. Although quantity restrictions under CMP Regulation No. 5 are on an "order" basis, if a person prefers to compute his expenditures on a "receipt" basis, he may do so, according to Direction 8. However, the use of one method for part of the supplies and another method for the rest is not permissible.

WPB Forms Two Additional Industry Advisory Committees

Washington

• • • **The WPB Director** of Industry Advisory Committees has announced the formation of the following industry advisory committees during the past week:

Farm Machinery and Equipment Transportation Industry Advisory Committee, government presiding officer, James W. Crofoot.

Committee members are: J. R. Dreffer, traffic manager, New Idea, Inc., Coldwater, Ohio; F. L. Fisher, traffic manager, Starline, Inc., Harvard, Ill.; M. L. Gibson, assistant traffic manager, International Harvester Co., Chicago; W. P. Mertsching, traffic manager, James Mfg. Co., Fort Atkinson, Wis.; H. J. Schroeder, general traffic manager, Deere & Co., Moline, Ill., and J. C. Shoemaker, traffic manager, Buckeye Incubator Co., Springfield, Ohio.

Bearing and Bushing Industry Advisory Committee, government presiding officer, R. L. Vaniman.

Committee members are: Frank I. Bowles, Kendrick Mfg. Co., Detroit; B. A. Brown, Moraine Products Division, General Motors Corp., Dayton; R. F. Crom, McQuay-Norris Mfg. Co., Indianapolis; P. J. Flaherty, Johnson Bronze Co., New Castle, Pa.; H. O. Johnson, Bound Brook Oilless Bearing Co., Bound Brook, N. J.; A. J. Langhammer, Amplex Division, Chrysler Corp., Detroit; James L. Myers, Cleveland Graphite Bronze Co., Cleveland; David W. Rodger, Federal-Mogul Corp., Detroit, and L. G. Hooker, Detroit Aluminum & Brass Corp., Detroit.

P-100 Revoked Except To Canadian Firms

Washington

• • • **WPB announced last week** that it had completely revoked Preference Rating Order P-100, which dealt with maintenance, repair and operating supplies. The order was revoked as of April 2, except as to producers in Canada, to whom a serially numbered copy had been issued. With complete revocation of the order, Canadian companies are now eligible to apply through the Department of Munitions and Supplies, Ottawa, to WPB for authorization to use the procedures established under CMP Regulation No. 5 to obtain their necessary maintenance, repair and operating supplies.

WPB Plans Limiting Class B List To 22 Products; Army-Navy Favored

Washington

• • • **WPB has a "tentative agreement"** to commit hari-kiri on Jan. 1, according to one of its spokesmen. On that date, WPB now plans, under Army pressure, to voluntarily reduce its jurisdiction over more than 300 Class B product classifications to a mere 22. This means that WPB may relinquish authority over approximately 3,000,000 of the 5,000,000 tons of steel handed out quarterly to Class B product manufacturers.

The Army has been trying for months to reduce WPB power, and under the new agreement this will be accomplished through letting the Army and Navy order most of the erstwhile Class B products and dole out the material for their manufacture.

The method adopted has been a point of contention between WPB officials among themselves, and also between WPB and the Army.

Class B product procedure is a carry-over from PRP, and those officials who favored PRP over CMP wanted the B list kept large. On the other hand, those who wanted vertical allocation wanted to reduce the B list.

One important WPB official does not think that the move will cause the dismissal of many WPB employees because the paper work in the agency will not be reduced by this move. The reason for this is that while a manufacturer may have to come to WPB for a small part of his materials, he will have to go to the Army or Navy or other military service for the rest.

Aside from this connotation of inefficiency in that paper work will be trebled by the action, many WPB officials predict that the move will be confusing to industry. It will be practically impossible to do any intelligent order board scheduling because WPB will only have only a portion of the information necessary to accomplish this purpose.

Also, Army and Navy officials may decide to take over the output of a plant, and when WPB decides it wants to count on part of that plant's production, it will face refusal.

The following product classifications will remain wholly within WPB's authority: Asbestos, metallic yarn and friction materials; bag ties; bearings, ball and metal; bearings, jewel; bearings, babbitted, common, sleeve (not live shaft bearings); bolts, nuts, pins, rivets, screws, studs, washers (standard items not aluminum); carbon products, including brushes; castings, iron, rough (excluding soil pipe); chains (except anchor); containers except those purchased by Claimant Agencies; fibrous glass products; fuses under 2300 volts; hooks and eyes, slide and snap fasteners, buckles, buttons, and miscellaneous apparel and shoe findings (other than government furnished); lamps, bulbs and tubes; nails and tacks (excluding steel wire nails); rubber goods, mechanical and rubber-hose; screen cloth; spark plugs; tires; tubes, and wiring.

All other products and components on the Class B product list are to be handled as Class A products whenever a Claimant Agency includes them in Scheduled production programs. All the Army has to do is to place the Class B products on scheduled production programs, and WPB won't have anything to do with it. If the Army should not put the products on the programs, then WPB will be able to parcel out materials.

WPB pretends that the reason that it has not made an outright grant of power to the services is that it alone has the necessary technical personnel to handle the paperwork involved in less than one-third of the materials left to it after the Class B list has been slashed. Also, the opinion has been expressed that WPB will have plenty of work to do even though it gives all the power over material allocation away, because it can then work on "increasing production and scheduling order boards."

WPB Finally Issues CMP Reg. No. 6 Governing Construction and Facilities

Washington

• • • **CMP Reg. 6,** covering the allocation of steel, copper and aluminum for construction, was issued by WPB June 30. This regulation has been long in writing. It explains how to get materials for construction and for facilities acquired in connection with construction under the Controlled Materials Plan. The regulation does not cover facilities not related to construction.

Contractors manufacturing Class A products off the site may receive allotments under this regulation, but their use of such allotments will be governed by CMP Reg. 1. Controlled materials for the manufacture of Class B products are not obtained under this regulation. Each claimant agency will distribute allotments received by it from the Requirements Committee of the WPB by making allotments to the prime contractors. Such allotment will designate the amount of each form of controlled material available to the prime contractor, during each quarter, for use by the prime contractor or allotment to a secondary contractor.

No construction may be carried on unless authorized by the WPB. An allotment of controlled materials is not in itself authorization to begin construction. The prime contractor, in addition to applying for authorization to begin construction, must apply for an allotment of all controlled materials which he needs and which are required by his secondary contractors.

A contractor who received an allotment for construction must not use it for any purpose except to get materials needed for the construction for which the allotment is made or to replace in inventory materials used for the construction. His inventory, however, may not exceed a practicable working minimum or the limits provided in CMP Reg. 2. Allotments on small orders will not be required, since they will be obtainable from warehouses. Small order limits are set at 1 ton for carbon steel, 400 lb. for alloy steel, 100 lb. for copper and copper base alloys and 20 lb. for aluminum.

Attached, as a supplement to the regulation, is a listing of the forms and agencies to which applications must be made for the various types of construction, such as residential, war housing, farm dwellings, public roads, utilities, railroads, petroleum, shipyards, command and special types.

PD-3A Extended

Washington

• • • **WPB has announced** that Form PD-3A, preference rating instrument used by claimant agencies will be valid until the supply has been exhausted. The form was to have expired on June 30.

Help Yourself to Patents Seized from Foreign Nations

Representative Lists of Some Applications of Value to Metal and Metalworking Industries Published by The Iron Age

New York

• • • Are you scouting around for new ideas? Interest is increasing over the patents and patent applications which the U. S. Alien Property Custodian has seized from enemy and enemy-occupied nations. Small and large firms alike may make use of them, since the government grants only non-exclusive licenses and charges no royalties.

Some of the larger corporations have obtained numerous complete sets for their study. The lists covering plastics, electricity and metals are reported particularly active.

As outlined in THE IRON AGE previously, around 50,000 patents and pending patent applications owned by enemy nationals and nationals of enemy-occupied countries have been vested.

Licenses are issued to any reputable American firm or individual on payment of a license application fee of $50 for each single patent, plus $5 for each additional related patent.

Lists of the patents are available for distribution on payment of a fee, 10c. for each numbered classification except for nine of the larger classes, where the charge is 25c. each. Complete catalog is available for $5. Classified lists and catalogs may be obtained from the Chicago branch of the Office of Alien Property Custodian.

If You Find Patents Which Appear Valuable—*Communicate with the Office of the Alien Property Custodian, Chicago. Or, send your questions to News Editor,* THE IRON AGE, *100 E. 42nd Street, New York, and every effort will be made to assist you. If sufficient interest is shown by readers,* THE IRON AGE *will arrange to publish lists of seized patents of interest to the metalworking industry. There are thousands of these seized patents, in addition to the applications for patents listed below.*

Partial List of Seized Applications, Believed Open for Licensing

Class 13—Electric Furnaces

A.P.C. 412,885. Low-frequency induction furnaces for fusing iron alloys. Fritz Walter, Berlin-Friedenau, Germany. Published June 1, 1943.

A.P.C. 438,410. Method and furnace for electrically melting glass. Francois Dumarest, Lyon, France. Published June 1, 1943.

Class 22—Metal Foundry

A.P.C. 162,538. Process for casting metal ingots and devices thereto. Walter Roth et al., Hannover, Germany. Published April 27, 1943.

A.P.C. 176,880. Inside-lined light metal engine cylinder and method of making same. Alfred Lesage, Schweinfurt, Germany. Published April 27, 1943.

A.P.C. 388,131. Centrifugated tubular bodies and processes and apparatuses for their manufacture. Jacques Boucher, Paris, France. Published April 27, 1943.

A.P.C. 436,540. Molds and in particular to foundry cores and to their manufacture. Georges Passeleco, Paris, France. Published April 27, 1943.

A.P.C. 127,067. Metal casting apparatus. Karl Friedrich Wagner, Friedrichshafen (Bodensee), Germany. Published June 1, 1943.

A.P.C. 308,716. Process for the uninterrupted casting of articles. Herbert Ruppik, Dusseldorf, Germany. Published June 1, 1943.

A.P.C. 334,087. Carbon brake body and metal holder unit. Ottmar Conradty, Rothenbach-on-the-Pegnitz, Germany. Published June 1, 1943.

A.P.C. 334,093. Contact device. Friedrich Leuchs, Nurnberg, Germany. Published June 1, 1943.

A.P.C. 393,919½. Method for the production of compound cast bearing brasses by means of the plunging casting process. Bernward Garre, Wiesbaden-Biebrich, Germany. Published June 1, 1943.

A.P.C. 414,207. Method of applying bush metal to bushes. Ernst Meier, Senior, Braunschweig, Germany. Published June 1, 1943.

A.P.C. 426,244. Molds and in particular to foundry cores and to their manufacture. Georges Passelecq et al., Paris France. Published June 1, 1943.

A.P.C. 453,655. Centrifugal castings. Pierre Boissou, Pamiers, Ariege, France. Published June 1, 1943.

Class 24—Fastening Devices

A.P.C. 359,454. Hold-fast appliances for holding various layers of thick materials together. Thea Stumpf, Francfort-on-Main, Germany. Published June 1, 1943.

A.P.C. 447,499. Fastening devices. Fritz von Opel, Miami, Fla. Published June 1, 1943.

Class 29—Metalworking

A.P.C. 191,168. Hot forging. Fritz Singer, Starnberg, Germany. Published April 27, 1943.

A.P.C. 238,270. Hydraulically operating gears or transmitting devices. Hans Molly, Berlin-Tempelhof, Germany. Published April 27, 1943.

A.P.C. 262,291. Milling planer with swingable tool-spindle. Raimondo Bolaffi, Milan, Italy. Published April 27, 1943.

A.P.C. 272,716. Method of manufacturing hollow valves. Louis Camille Andre Gardelle et al., Paris, France. Published April 27, 1943.

A.P.C. 275,082. Piston rings and method of making same. Tetsutaro Hiromi et al., Yodobashi-ku, Tokyo, Japan. Published April 27, 1943.

A.P.C. 275,357. Securing the heads to the cylinders of internal combustion engines. Theodor Hembold, Munich, Germany. Published April 27, 1943.

A.P.C. 278,768. Process and installation for the manufacture of shaped metal products. Robert Mautsch, Brussels, Belgium. Published April 27, 1943.

A.P.C. 290,911. Wheels. Paul Lemmerz, Konigs-winter-am-Rhein, Germany. Published April 27, 1943.

A.P.C. 308,727. Method for repairing roll passes. Simon Hellmanns, Dortmund-Berghofen, Germany. Published April 27, 1943.

A.P.C. 314,204. Blades for exhaust turbines and the method for the manufacture thereof. Gustav Zellbeck et al., Munich, Germany. Published April 27, 1943.

A.P.C. 326,822. Driving device for machines for the continuous automatic mass production of workpieces. Gerhard Reiners, Neubrandenburg, Germany. Published April 27, 1943.

A.P.C. 352,616. Metal sawing machines. Takao Hasegawa, Osaka, Japan. Published April 27, 1943.

A.P.C. 370,078. Multi-spindle automatic lathe with feeding spindle-drum and box-shaped, mutually staying upper works. Erwin Kohring, Cologne-Poll, Germany. Published April 27, 1943.

A.P.C. 370,079. Multi-spindle automatic lathe with feeding spindle drum. Erwin Kohring, Koln-Poll, Germany. Published April 27, 1943.

(Continued on Next Page)

A.P.C. 376,570. Tool with hard metal cutting edge. Richard Braun, Stuttgart-S, Germany. Published April 27, 1943.

A.P.C. 377,048. Process for protecting aluminum alloys. Gaston Gauthier, Chambery (Savoie), France. Published April 27, 1943.

A.P.C. 377,049. Process for protecting aluminum alloys. Gaston Gauthier, Chambery Savoie, France. Published April 27, 1943.

A.P.C. 377,251. Process of producing metal fibres. Camille Cito, Uccle-Brussels, Belgium. Published April 27, 1943.

A.P.C. 379,134. Feeding and clamping device for multi-spindle automatic lathes for the treatment of rod-shaped material. Erwin Kohring, Cologne-Poll, Germany. Published April 27, 1943.

A.P.C. 385,760. Method of manufacturing hollow poppet valves. Gabriel Jeudi, alias Jeudy et al., Nogent-sur-Marne, France. Published April 27, 1943.

A.P.C. 392,514. Magnetic circuit comprising a laminated coiled core. Jan Kuperus, Eindhoven, Holland. Published April 27, 1943.

A.P.C. 430,822. Construction of welded tanks and other structures. Raymond Saulnier, Paris, France. Published April 27, 1943.

A.P.C. 430,823. Methods of assembly of tanks and the like. Raymond Saulnier, Paris; France. Published April 27, 1943.

A.P.C. 394,370. Producing thread. Ernst Lickteig et al., Neuss-on-the-Rhine, Germany. Published June 1, 1943.

A.P.C. 407,518. Cutter head for milling machines. Karl Jansen, Mannheim, Germany. Published June 1, 1943.

Class 51—Abrading

A.P.C. 223,269. Work turning device for machine tools. Kurt Zwick, Munchen, Germany. Published April 27, 1943.

A.P.C. 250,446. Centrifuges for granular material for cleaning and scaling plants. Karl Grocholl, Brieg-Schusseindorf, Germany. Published April 27, 1943.

A.P.C. 382.051. Tool grinding machine. Kurt Zwick, Munchen, Germany. Published April 27, 1943.

A.P.C. 422,615. Grinding machine. Max Ahnert, Aschersleben, Germany. Published April 27, 1943.

A.P.C. 425,448. Semi-automatic machine intended for finishing the grooves of ball bearing rings Emile Francois Louis Beduneau, Thomery, France. Published April 27, 1943.

Class 75—Metallurgy

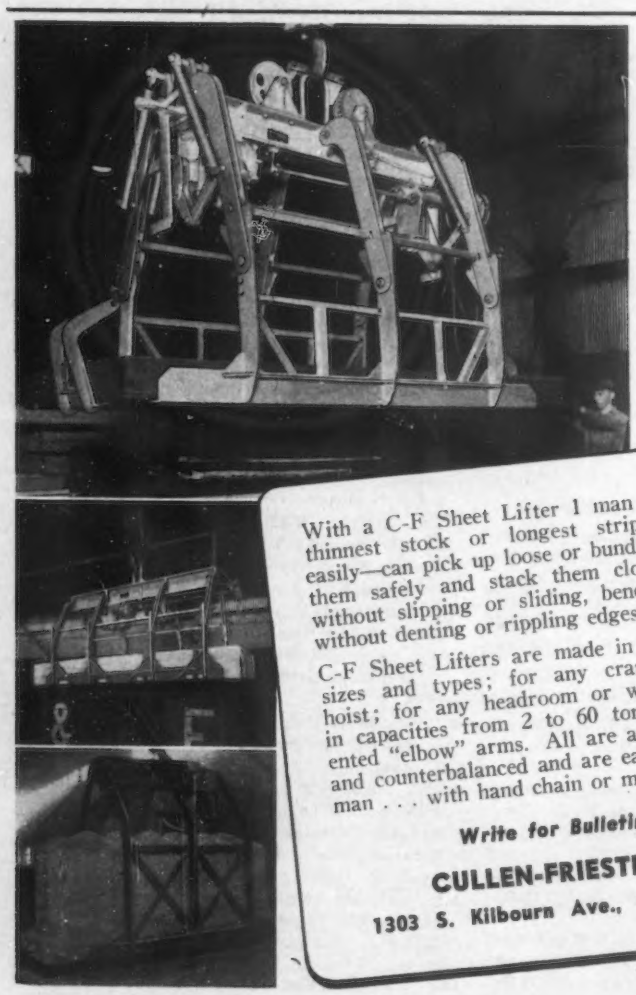
A.P.C. 171,130. High speed steel. Franz Rapatz et al., Buderich, Germany. Published May 4, 1943.

A.P.C. 272,044. Process for the production of steel from pig iron. Franz Bartscherer et al., Duisburg-Hamborn, Germany. Published May 4, 1943.

A.P.C. 285,858. Purification of pig iron. Johannes Haag, Neunkirchen, Germany. Published May 4, 1943.

A.P.C. 288,900. Process for the production of first run metal or steel from steel pig iron or of a bessemer pig iron containing phosphorus. Franz Bartscherer et al., Duisburg-Hamborn, Germany. Published May 4, 1843.

A.P.C. 303,611. Magnesium alloys. Arthur Burkhardt et al., Berlin-Lichterfelde-West, Germany. Published May 4, 1943.



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A.P.C. 327,066. Light metal alloys having a preponderating percentage of aluminum. Bernward Garre, Stuttgart, Germany. Published May 4, 1943.

A.P.C. 339,389. Purifying metals. Rene Perrin, Paris, France. Published May 4, 1943.

A.P.C. 345,176. Method of producing chromiferous steels. Johannes Haag, Neunkirchen (Saar), Germany. Published May 4, 1943.

A.P.C. 352,513. Method of and apparatus for operating shaft furnaces for roasting and the like. Bernhard Osann, Berlin-Lichterfelde, Germany. Published May 4, 1943.

A.P.C. 357.822. Method of manufacturing permanent magnets. Hans Neumann et al., Berlin-Siemensstadt, Germany. Published May 4, 1943.

A.P.C. 360,935. Reducing oxidic ores. Wilhelm Schwier, Dusseldorf, Germany. Published May 4, 1943.

A.P.C. 369,746. Magnesium base alloys. Franz Sauerwald et al., Breslau, Germany. Published May 4, 1943.

A.P.C. 377,754. Process for producing pure iron or iron alloys. Filippo Venzi et al., Rome, Italy. Published May 4, 1943.

A.P.C. 387,769. Light metals and their alloys. Henry Lepp, Paris, France. Published May 4, 1943.

A.P.C. 388,276. Iron oxides and method of producing same. Olav Moeklebust et al., Fredrikstad, Norway. Published May 4, 1943.

A.P.C. 409,751. Method for purifying bismuth. Leon Jean Baptiste Guyard, Paris, France. Published May 4, 1943.

A.P.C. 429,340. Slag-forming material for an arc-welding rod and method for the manufacture thereof. Josef Ter Berg, Eindhoven, Holland. Published May 4, 1943.

A.P.C. 124,858. Heat resisting alloys. Werner Hessenbruch, Hanau-on-the-Main, Germany. Published June 1, 1943.

A.P.C. 279,960. A process for the production of pure iron or iron alloys. Vincenzo Arata, Rome, Italy. Published June 1, 1943.

A.P.C. 355,846. Manufacture of low-carbon ferro-alloys. Rene Perrin, Paris, France. Published June 1, 1943.

A.P.C. 369,748. Magnesium base alloys. Franz Sauerwald et al., Breslau, Germany. Published June 1, 1943.

A.P.C. 384,127. Process and oven for the production of metallic magnesium. Luigi Amati, Padova, Italy. Published June 1, 1943.

A.P.C. 391,000. Process and a device for producing iron or iron alloys. Fritz Eulenstein et al., Koln A/Rhein, Germany. Published June 1, 1943.

A.P.C. 402,276. Method of directly producing pig iron and steel. Julius Lohse, Berlin-Wilmersdorf, Germany. Published June 1, 1943.

A.P.C. 416,756. Cast-irons and their manufacture. Leonce Reygagne, Decazeville, France. Published June 1, 1943.

Class 76—Metal Tools and Implements Making

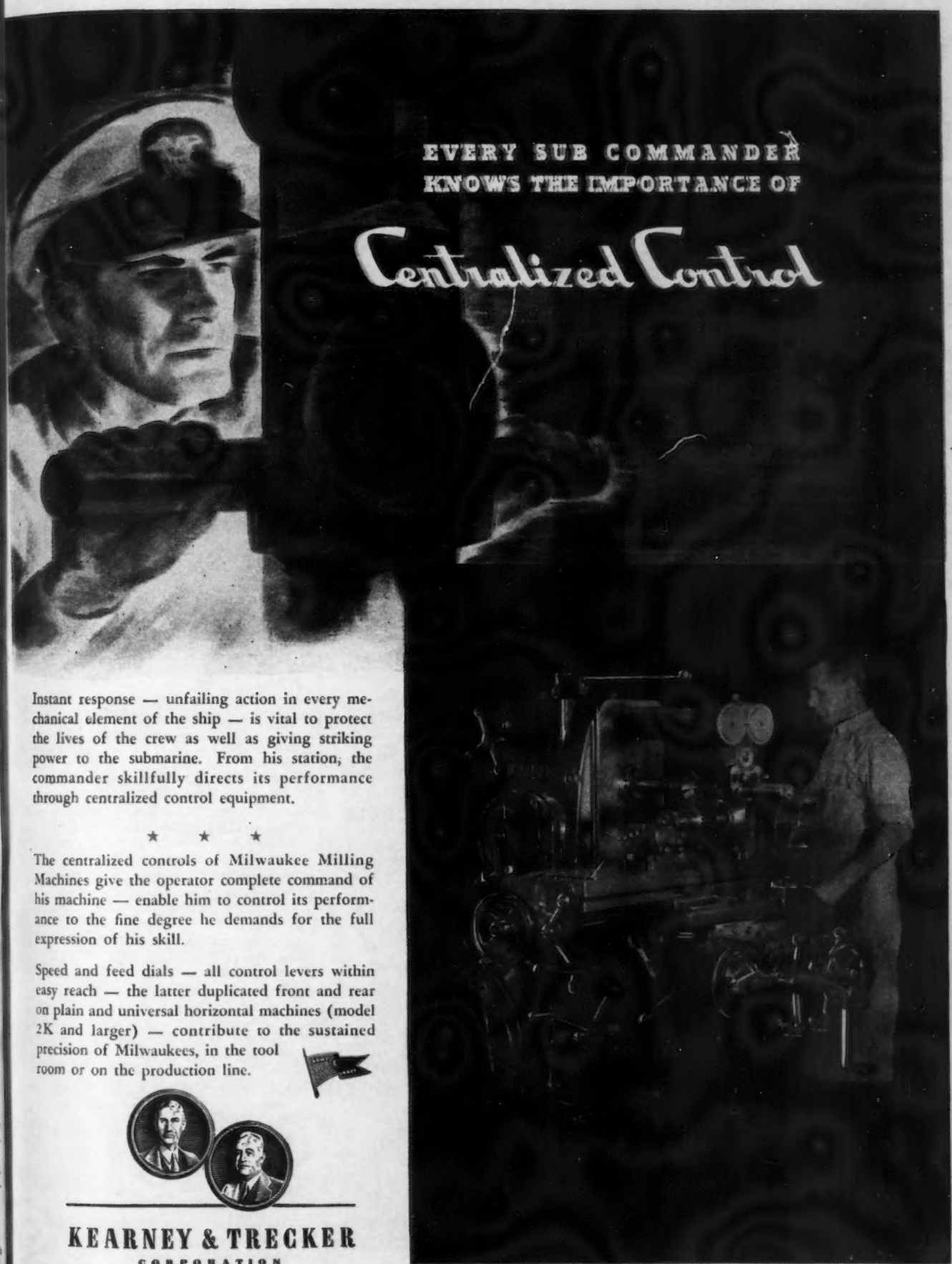
A.P.C. 368,873. Stamping die. Roger Adolphe Leonard Seligmann, Paris, France. Published May 4, 1943.

A.P.C. 406,948. Method of producing tools. Friedrich Wenzel. Berlin-Siemensstadt, Germany. Published June 1, 1943.

Class 78—Metal Forging and Welding

A.P.C. 418,834. Riveted joints. Friedrich Mayer et al., Regensburg, Germany. Published May 4, 1943.

A.P.C. 428,844. Methods of producing articles by hot pressing or extruding an apparatus for their performance. Fritz Von Opel, New York, N. Y., a citizen of Lichtenstein. Published May 4, 1943.



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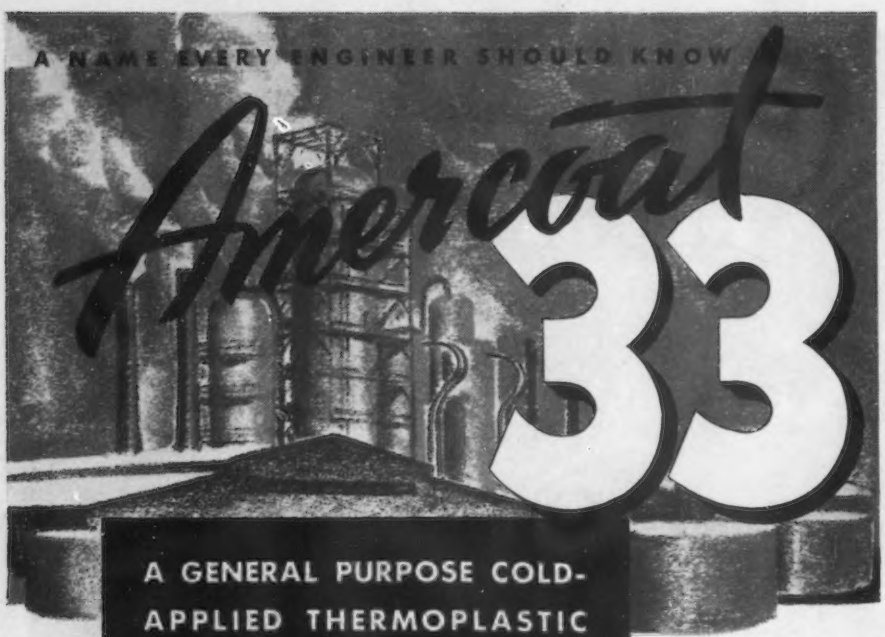

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NEWS OF INDUSTRY

A.P.C. 376,385. Riveting apparatus. Hubert Mortl, Regensburg, Germany. Published June 1, 1943.

Class 80—Metal Rolling

A.P.C. 318,112. Method of rolling strip from. Gerhard Zur Nedden et al., Peine, near Hannover, Germany. Published May 4, 1943.

A.P.C. 320,472. Screw-threading machine. Werner Plagemann et al., Berlin, Germany. Published May 4, 1943.

A.P.C. 358,173. Tube rolling system. Helmut Dorn, Riesa, Germany. Published May 4, 1943.

A.P.C. 360,152. Screw threading machine. Werner Plagemann, Berlin, Germany. Published May 4, 1943.

A.P.C. 367,878. Machine tools and the like. Wilhelm Wemhoner, Berlin-Karlshorst, Germany. Published May 4, 1943.

A.P.C. 371,079. Method and apparatus for sizing tubes. Muneshige Ichikawa, Omori-ku-Tokyo, Japan. Published May 4, 1943.

A.P.C. 367,509. Device for making screw threads. Albert Schutte, Dessau, Anhalt, Germany. Published June 1, 1943.

Class 81—Tools

A.P.C. 363,378. Combined nut wrench and free-running ratchet. Friedrich Wilhelm Thienes, Solingen, Germany. Published May 4, 1943.

Class 82—Turning

A.P.C. 314,080. Semi-automatic lathe. Fritz Richard Deuring, Munchen-Gladbach, Germany. Published May 4, 1943.

A.P.C. 345,336. Controlling mechanism for lathes. Hermann Schumacher, Coppingen (Wurttemberg), Germany. Published May 4, 1943.

A.P.C. 358,561. Device for actuating an automatic lathe, especially a spar bench. Johannes Wilberz, Hilden-on-the-Rhine, Germany. Published May 4, 1943.

A.P.C. 362,654. Multi-spindle automatic lathe with spindles horizontally removable in the spindle box. Ernst Gothe, Cologne-Poll, Germany. Published May 4, 1943.

A.P.C. 369,503. Arrangements for electrically controlling operation of machine tools. Hidezo Tutiya, Tokyo-si, Japan. Published May 4, 1943.

A.P.C. 377,252. Process for the manufacture of shaped metal products. Camille Cito. Uccle-Brussels, Belgium. Published May 4, 1943.

A.P.C. 390,058. Arrangement of the transverse supports in automatic and semi-automatic lathes. Fritz Richard Deuring. Munchen-Gladbach, Germany. Published May 4, 1943.

A.P.C. 436,340. Tool mountings. Ernst Hijmans, The Hague, Netherlands. Published May 4, 1943.

Class 83—Mills

A.P.C. 233,862. Adjustable closed circuit grinding process. Aldo Bibolini, Turin, Italy. Published May 4, 1943.

A.P.C. 312,133. Lining for tube mills or crushing mills containing balls or similar crushing bodies, Jacques Fernand Henricot, Court-St. Etienne, Belgium. Published May 4, 1943.

A.P.C. 451,014. Method of obtaining perfectly conservable integral meal. Voldemar Borsakovsky, Saint-Julian par Sennecey le Grand (Saone-et-Loire), France. Published June 1, 1943.

A Letter from Guadalcanal...

In a recent letter from a lad at Guadalcanal to his former employer was voiced the greatest challenge of our time.

"What," he said, "am I, and all these fellows with me, going to do when this thing is over?" Is peace to bring with it the deadly spiral: men laid off and demobilized, hence less purchasing power, hence more plants closed down, hence more men laid off, hence — ?

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Note—in addition to the applications which the government has seized, thousands of patents have been taken over and are available. If sufficient interest is shown by readers, THE IRON AGE *will be glad to consider publishing representative lists of patents which would be valuable to metals producing and metal using plants. The data published in this issue are seized applications for patents.*

A.P.C. 364,826. Oscillation tube mill. Siegfried Kiesskalt et al., Frankfurt-am-Main, Germany. Published May 4, 1943.

A.P.C. 367,286. Process and apparatus for comminuting liquid substances. Otto Lanegraf, Frankfurt (Main), Germany. Published May 4, 1943.

A.P.C. 372,589. Device for disintegrating or homogenizing. Dittmar Bachmann, Frankfurt-am-Main, Germany. Published May 4, 1943.

A.P.C. 377,339. Slag cooling and granulation device. Josef Cermak, Hradec Kralove, Bohemia. Published May 4, 1943.

Class 90—Gear Cutting, Milling, and Planing

A.P.C. 222,743. Electric Feeler controls for machine tools. Eduard Felix Muller, Leipzig, Germany. Published May 4, 1943.

A.P.C. 240,370. Method and a machine for the progressive cutting by generation of involute teeth. Jean Joseph Capelle, Clamart, France. Published May 4, 1943.

A.P.C. 322,679. Feed gears. Emil Panthoefer, Siegen, Germany. Published May 4, 1943.

A.P.C. 328,824. Machines for milling the flanges of airplane wing spars. Emile Julien Eugene Dewoitine, Neuilly-sur-Seine, France. Published May 4, 1943.

A.P.C. 335,780. Tracer control for machine tools, Paul Volk, Berlin-Charlottenburg, Germany. Published May 4, 1943.

A.P.C. 349,194. Feed apparatus for moving the feeler pin holder of copy milling machines. Hermann Ehrenberg, Langen (Hesse), Germany. Published May 4, 1943.

A.P.C. 352,035. Safety device for machine tools. Shinkuro Mikami, Tokyo, Japan. Published May 4, 1943.

A.P.C. 352,036. Safety device for machine tools using photo-electric tubes. Shinkuro Mikami, Tokyo, Japan. Published May 4, 1943.

A.P.C. 392,532. Gear shaping machines. Georg Gert Frederichs, Kassel-Brasselsberg, Germany.

A.P.C. 394,220. Milling machines. Carl Schmid, Leipzig, Germany. Published May 4, 1943.

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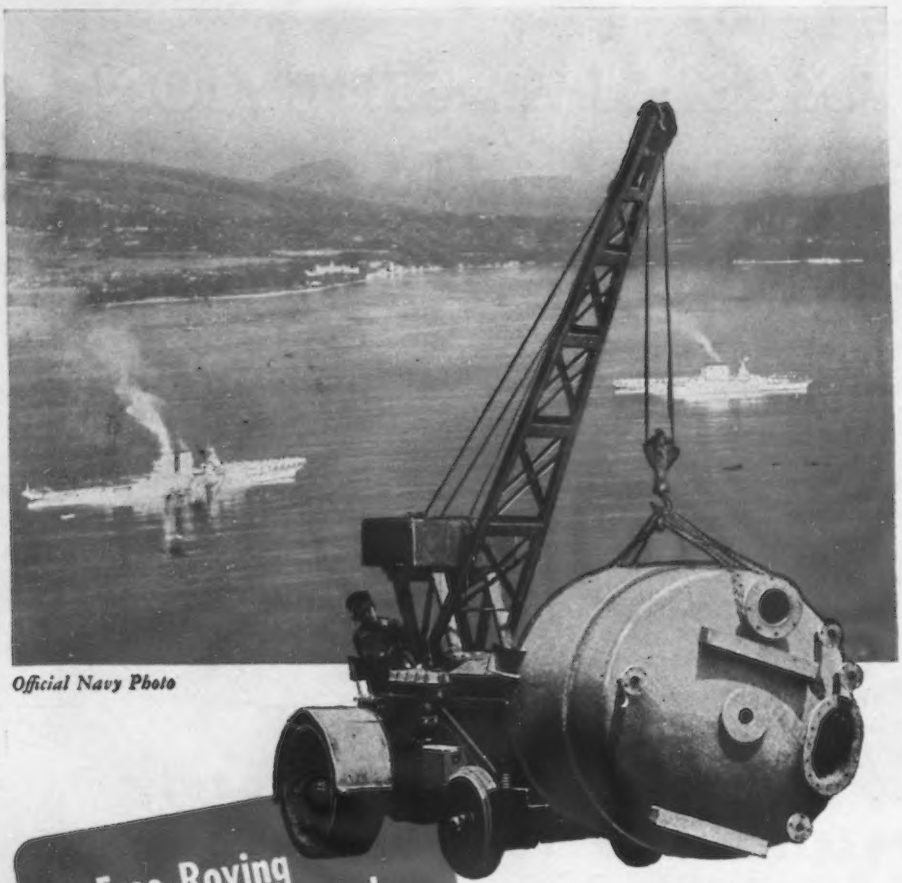

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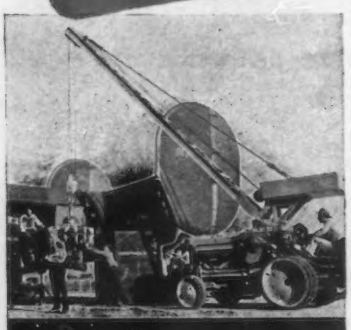

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NEWS OF INDUSTRY

A.P.C. 401,785. Tracer control for tool machines. Paul Volk, Berlin-Charlottenburg, Germany. Published May 4, 1943.

A.P.C. 415,230. Device making it possible to insure the horizontality and locking of an overhanging arm moving vertically along a column. Charles William Berthiez, Paris, France. Published May 4, 1943.

A.P.C. 416,130. System of heat milling for steel ingots. Leonida Antonelli et al., Padova, Italy. Published May 4, 1943.

A.P.C. 417,826. Cutting frame for dividing apparatus. Rudolf Wilhelm Lipp, Berlin-Pankow, Germany. Published May 4, 1943.

A.P.C. 426,200. Copying machine. Kurt Zwick, Munchen, Germany. Published May 4, 1943.

A.P.C. 431,768. Milling machine for ingots. Leonida Antonelli et al., Este, Padova, Italy. Published May 4, 1943.

Class 113—Sheet Metal Ware-Making

A.P.C. 435,234. Method and machine for constricting a tube by means of a revolving die. Oreste Flavio Alfred Biginelli, Clermont-Ferrand, France. Published June 1, 1943.

Class 121—Motors
Expansible Chamber Type

A.P.C. 390,239½. Welded crank case, especially for multi-cylinder piston engines, the cylinders being arranged in a row. William Werner, Chemnitz, Germany. Published June 1, 1943.

A.P.C. 390,240½. Welded crank case. William Werner, Chemnitz, Germany. Published June 1, 1943.

Class 123—Internal Combustion Engines
(Copies Cost 25c)

A.P.C. 167,568. Engine starting apparatus. Reinhold Freitag et al., Stuttgart-Unterturkheim, Germany. Published June 1, 1943.

A.P.C. 235,881. Regulation of the combustible mixture for internal combustion engines. Prosper L'Orange, Stuttgart, Germany. Published June 1, 1943.

A.P.C. 283,096. Apparatus for controlling the fuel supply of internal combustion engines. Max Hurst et al., Stuttgart, Germany. Published June 1, 1943.

A.P.C. 322,387. Ignition device for internal combustion engines. Franz Dausinger, Stuttgart, Germany. Published June 1, 1943.

A.P.C. 383,029. Starting device for internal combustion engines. Albert Callsen, Stuttgart, Germany. Published June 1, 1943.

A.P.C. 414,028. Explosion and internal combustion engines. Henri Leopold Javal, Vichy, France. Published June 1, 1943.

A.P.C. 419,783. Two-stroke engine Emile Claveau, Paris, France. Published June 1, 1943.

A.P.C. 436,355. Explosion or combustion engines. Claude Etienne Bonnier, Neuilly-sur-Seine, France. Published June 1, 1943.

Class 148—Metal Treatment

A.P.C. 174,078. Method of increasing the quality of structures of aluminum alloy such as girders for airships and the like. Ludwig Durr, Friedrichshafen, Bodensee, Germany. Published May 11, 1943.

A.P.C. 283,320. Methods of producing hard-soldered or welded joints. Hans Edner, Dessau, Germany. Published May 11, 1943.

A.P.C. 304,413. High grade steels for building purposes. Roland Wasmuht, Dortmund, Germany. Published May 11, 1943.

A.P.C. 315,184. Process for the production of colored protective layers on castings, especially die-castings, of magnesium base alloys. Gustav Siebel et al., Bitterfeld, Germany. Published May 11, 1943.

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A.P.C. 339,132. Process for the introduction of chromium into iron or steel articles. Gottfried Becker et al., Buderich Bei Dusseldorf, Germany. Published May 11, 1943.

A.P.C. 360,936. Producing rails of high resistance to wear. Fritz Hofmann, Starachowice, Poland. Published May 11, 1943.

A.P.C. 369,614. Production of corrosion-proof surfaces on steel by chromium diffusion. Gottfried Becker et al., Buderich, near Neuss, Germany. Published May 11, 1943.

A.P.C. 377,047. Aluminum alloys. Gaston Gauthier, Chambery (Savoie), France. Published May 11, 1943.

A.P.C. 383,243. Method of eliminating impurities contained in iron and steel, and vacuum oven heated by glow discharge, more particularly annealing and melting oven adapted to carry into effect said method. Wilhelm Burkhardt, Berlin-Gruenwald, Germany. Published May 11, 1943.

A.P.C. 421,960. Process for the production of articles made of iron and steel with corrosion-proof surface. Gottfried Becker et al., Buderich B. Neuss, Germany. Published May 11, 1943.

A.P.C. 322,034. Magnesium base alloys. Adolf Beck et al., Bitterfeld, Germany. Published June 1, 1943.

A.P.C. 369,617. Method for the production of corrosion-proof and heat-proof chromium coatings. Gottfried Becker et al., Buderich, near Neuss, Germany. Published June 1, 1943.

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A.P.C. 414,206. Process of manufacturing composite metal bodies. Ernst Meier, Sr., Braunschweig, Germany. Published June 1, 1943.

A.P.C. 416,914. Process of rustproofing metals and objects with a metallic surface. Aegidius Lankhorst, Nijmegen, Holland. Published June 1, 1943.

Class 153—Metal Bending

A.P.C. 268,830. Bending rollers for bar or rod iron benders or the like. Anton Wagenbach, Wuppertal-Elberfeld, Germany. Published May 11, 1943.

A.P.C. 283,285. Bender for rolled-up strip such as window frame, pipe or fuel tank of motor vehicles. Takeo Sato, Tsurumi-ku, Yokohama, Japan. Published May 11, 1943.

A.P.C. 296,515. Method of straightening metal bars. Rudolf Schmidt, Vienna, Germany. Published May 11, 1943.

A.P.C. 360,151. Straightening machine for sheet metal plates. Fritz Ungerer, Pforzheim, Germany. Published May 11, 1943.

A.P.C. 373,697. Method for the manufacture of high grade metal bars, rods or the like. Rudolf Schmidt, Vienna, Austria. Published May 11, 1943.

Class 174—Electricity
Conductors and Insulators

A.P.C. 193,918. Aluminum sheathed cables. Hans Schmitt et al., Berlin-Charlottenburg, Germany. Published May 18, 1943.

A.P.C. 222,943. Electric wires and method of making the same. Jean Lepetit, Clichy, France. Published May 18, 1943.

A.P.C. 258,571. Electric conductors. Jean Lepetit, Clichy, France. Published May 18, 1943.

A.P.C. 260,226. Electric conductors. Philippe Eugene Henri Eichinger, Clichy, France. Published May 18, 1943.

Class 175—Electricity
General Applications

A.P.C. 312,864. Use of iron-chromium alloys. Hermann Fahlenbrach et al., Essen-Steele, Germany. Published May 18, 1943.

A.P.C. 335,224. High frequency iron core. Fritz Bergtold, Munchen, Germany. Published May 18, 1943.

A.P.C. 362,878. Electrolytic condensers. Akira Miyata, Tokyo, Japan. Published May 18, 1943.

Class 202—Distillation

A.P.C. 320,951. Coke ovens. Joseph Schafer, Dortmund, Germany. Published May 18, 1943.

A.P.C. 360,502. Method of increasing the inclination of vinyl acetate to polymerize. Willy O. Herrmann et al., Deisenhofen, Germany. Published May 18, 1943.

A.P.C. 365,336. Method of making and applying a filtering material. Otto Kuhne, Frankfort-on-Main, Germany. Published May 18, 1943.

A.P.C. 382,694. Recovery of extraction agents. Alfred Dierichs, Leverkusen-Wiesdorf, Germany. Published May 18, 1943.

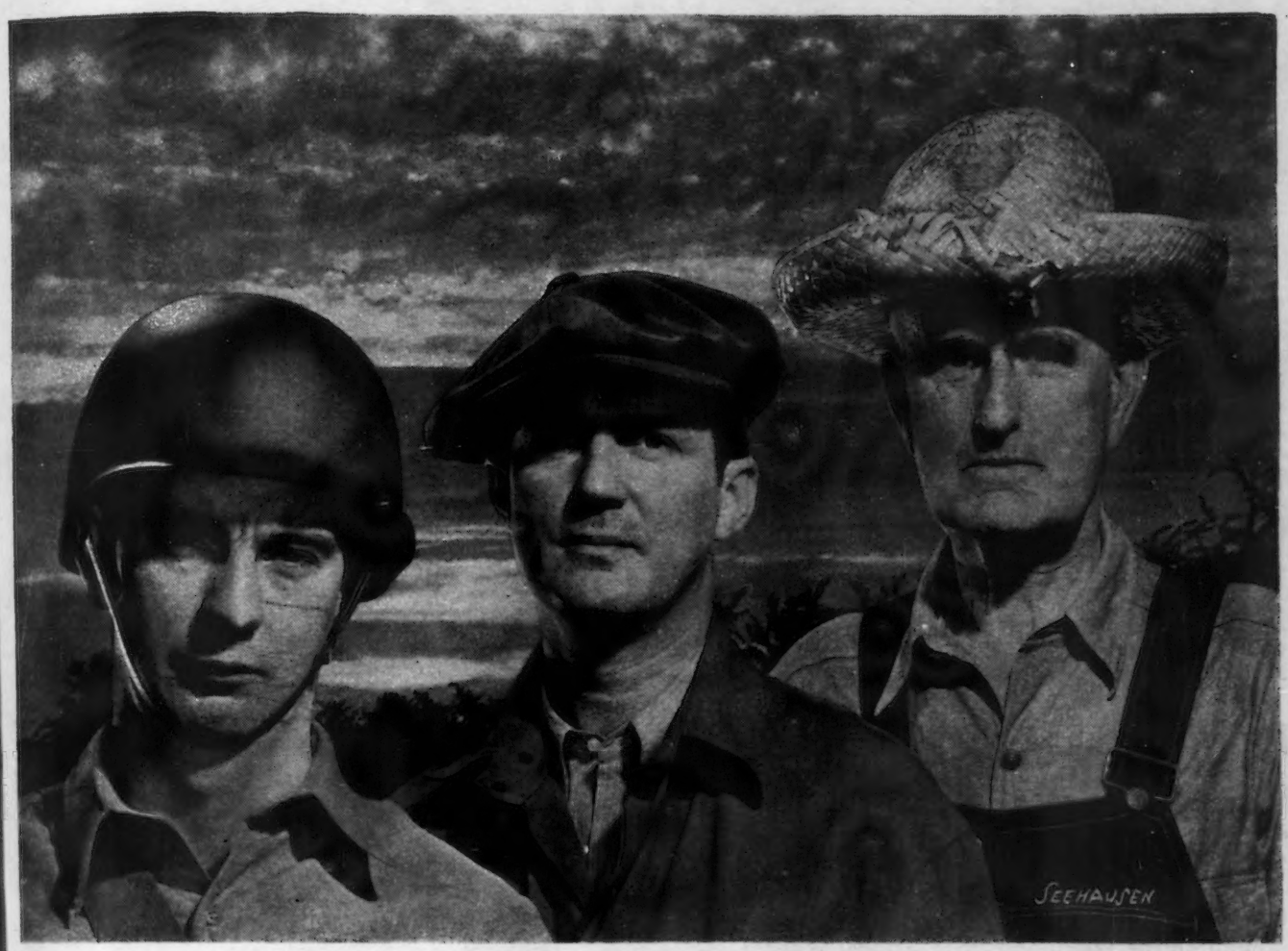
A.P.C. 400,988. Regenerative coke ovens. Nikolaus M. Philipsen, Tokyo, Japan. Published May 18, 1943.

Class 204—Chemistry, Electrical, and Wave Energy

A.P.C. 214,954. Process for the manufacture of zinc. Hermann Wolf, et al., Duisburg, Germany. Published May 18, 1943.

A.P.C. 216,289. Method for electrolytically refining copper and its alloys. Gunther Hansel, Berlin-Siemensstadt, Germany. Published May 18, 1943.

A.P.C. 228,143. Method of producing coatings on magnesium or its alloys. Walter Mann-



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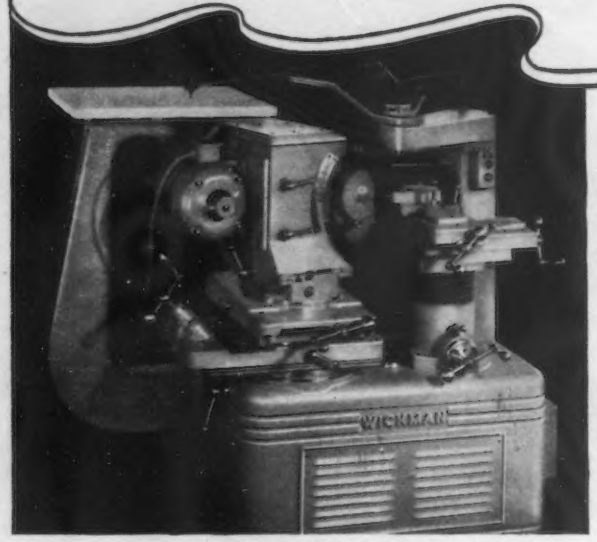

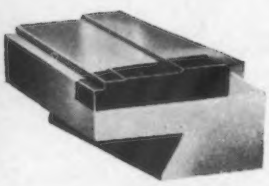

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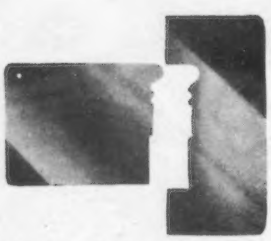
Width of Carbide Tip . . 1½"
Depth of Cut . . . . . .120"
Stock removed — approx. .040"
Grinding time . . . . . 2 hrs.

In TUNGSTEN-CARBIDE or OTHER HARD METALS

Directly From The Drawing

Each of the parts illustrated at the right were ground on the Wickman Profile Grinder without the use of a radius dresser or formed wheel. Any other desired regular or irregular shape within the range of the machine can also be finish ground.



HARDENED STEEL CONTOUR GAGES

Width of pieces . . . . . 3½"
Depth of cut . . . . . ½"
Stock removed — approx. .032"
Sixteen pieces stacked and ground in one time, in 3½ hours or 14 minutes per gage.

The Wickman Profile Grinder is actually a combination of a universal grinder and a microscopic inspection device. It employs a paper and pencil layout 50 times the size of the profile to be ground and a 30 power microscope. The long arm of the pantograph carries a pointer which is moved by the operator from point to point along the line of the layout. The cross hairs in the optical center of the microscope which is carried on the short arm of a 50:1 pantograph, is focused on the work and grinding wheel. The intersection of these cross hairs corresponds to the position of the pointer on the 50 times size layout.

The grinding wheel is manually fed to the intersection of the cross hairs after each movement of the pantograph arm and its exact position is observed through the 30 power microscope. Because of the fact that the wheel is always fed up to a predetermined point, accuracy is not affected by wheel wear. An accuracy to within .0005" may be obtained and reasonable care on the part of the operator makes closer limits possible.

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chen, Dessau, Germany. Published May 18, 1943.

A.P.C. 230,090. Method and device for the electrolytic oxidation of thin wires. Friedrich Durr, Berlin-Friedenau, Germany. Published May 18, 1943.

A.P.C. 231,799. Electrolytic apparatus for producing a hydroxide of metal. Eiji Munekata, Nobeoka, Japan. Published May 18, 1943.

A.P.C. 297,191. Process for the protection of magnesium and its alloys. Jean Frasch, Clichy, France. Published May 18, 1943.

A.P.C. 302,054. Method of producing protective layers on magnesium and magnesium alloys. Hugo Huber et al., Mohringen/Filder, Germany. Published May 18, 1943.

A.P.C. 352,416. Process for the electrolytic production of opaque layers, similar to enamel, on aluminum and its alloys. Carlo Sonnino et al., Milan, Italy. Published May 18, 1943.

A.P.C. 354,622. Method of manufacturing hollow propeller blade for aircraft. Yutaka Sakamoto, Shizuoka-ken, Japan. Published May 18, 1943.

A.P.C. 355,522. Process for electrolytically producing bright deposits of zinc on other metals, for example on iron. Wolfgang Howaldt et al., Andernach-on-Rhine, Germany. Published May 18, 1943.

A.P.C. 356,108. Method for decreasing or preventing the actions of pickling acid on metals, especially iron and metal alloys. Willibald Machu et al., Vienna, Germany. Published May 18, 1943.

A.P.C. 362,843. Electrolytic cells. Bela Feledi, Budapest, Hungary. Published May 18, 1943.

A.P.C. 363,564. Method of plating tubes. Ulrich Raydt et al., Osnabruck, Germany. Published May 18, 1943.

A.P.C. 369,610. Refining aluminum. Werner Helling et al., Braunau, Germany. Published May 18, 1943.

A.P.C. 387,252. Process for attacking aluminum for increasing its working surface and apparatus therefor. Gedal Guterman, Paris, France. Published May 18, 1943.

A.P.C. 411,429. Methods for purifying manganese in metal state. Pietro Guareschi, Genoa, Italy. Published May 18, 1943.

A.P.C. 411,430. Methods for producing manganese in metal state and pure manganese dioxide if desired, from manganese ores. Pietro Guareschi, Genoa, Italy. Published May 18, 1943.

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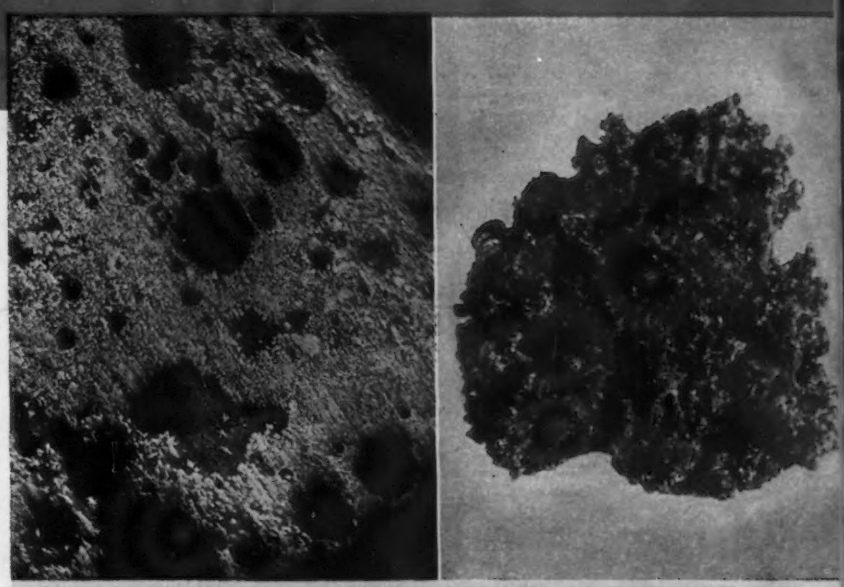
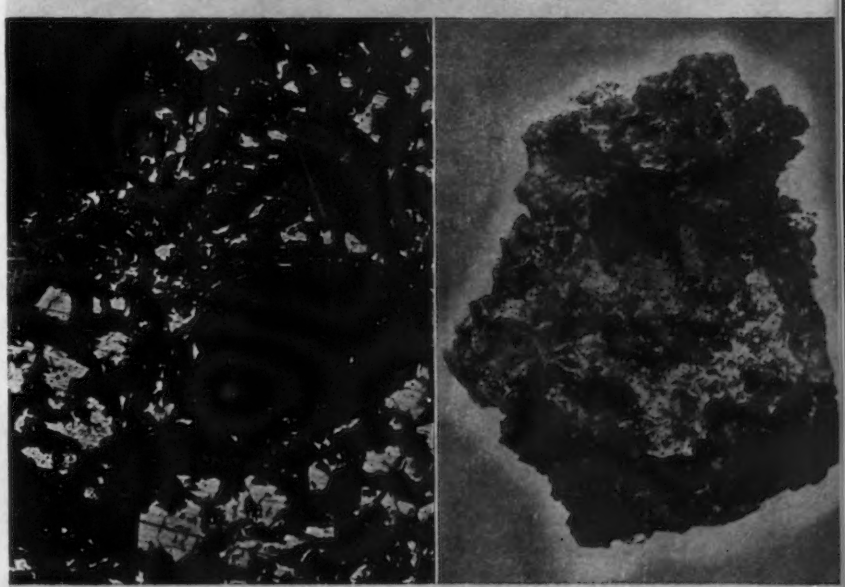


IDEAL BLAST-FURNACE SINTER. *Microscopic cross section of sinter (100 times enlarged) shows uniform cell structure which provides maximum surface for gas contact.*



POOR BLAST-FURNACE SINTER. *Note density and uneven cell structure providing poor gas contact.*

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A.P.C. 425,186. Processes for machining light metals and alloys. Jean Bary, Clichy, France. Published May 18, 1943.

Class 207—Plastic Metal Working

A.P.C. 362,833. Press for manufacturing tubes, rods or the like. Ferdinand Hanff, Berlin-Charlottenburg, Germany. Published May 18, 1943.

A.P.C. 384,913. Extrusion devices for the manufacture of cable sheaths. Walter Hyprath, Berlin-Wilmersdorf, Germany. Published May 18, 1943.

Class 214—Material Handling

A.P.C. 373,295. Pusher rams for coke ovens. Heinrich Koppers, Essen, Germany. Published May 25, 1943.

Class 218—Rivet Setting

A.P.C. 268,414. Method for inside riveting by means of hollow rivets and means for achieving the same. Adamo Cucchi et al., Sesto S. Giovanni, Milan, Italy. Published May 25, 1943.

A.P.C. 406,071. Riveted joints. Jean Emile Francois Gobin dit Daude, Neuilly-Sur-Seine, France. Published May 25, 1943.

A.P.C. 406,072. Riveted joints. Jean Emile Francois Gobin dit Daude, Neuilly-Sur-Seine, France. Published May 25, 1943.

Class 219—Electric Heating

A.P.C. 152,008. Device for connecting sheet metal members. Gerhard Heim, Sindelfingen, Germany. Published May 25, 1943.

A.P.C. 232,237. Electric reaction furnace. Bernhard Berghaus et al., Berlin-Lankwitz, Germany. Published May 25, 1943.

A.P.C. 377,905. Welding rod, and in particular electrode for electric arc welding. Camille Cito, Uccle-Brussels, Belgium. Published May 25, 1943.

A.P.C. 380,728. Electric device and method for heating materials. Frans Michel Penning, Eindhoven, Holland. Published May 25, 1943.

A.P.C. 344,220. Method and apparatus for electric resistance welding of tubes. David Sciaky, Paris, France. Published June 1, 1943.

A.P.C. 378,076. Device for electric resistance welding. Gerhard Hagedorn, Berlin-Lichterfelde-West, Germany. Published June 1, 1943.

A.P.C. 378,465. A device for electric resistance welding, Gerhard Hagedorn, Berlin-Lichterfelde-West, Germany. Published June 1, 1943.

A.P.C. 387,342. Arrangement for the high-frequent heating of band-shaped metal, especially for the production brasses. Herbert Jan Oskar Gumprecht, Wiesbaden, Germany. Published June 1, 1943.

Class 220—Metallic Receptacles

A.P.C. 238,039. Seamless drum for use in high-pressure boilers and the like. Maximilian von Schwarz, Freiberg, Germany. Published May 25, 1943.

A.P.C. 242,591. Closure for containers. Alfons Mauser, Rondorf Bei, Cologne, Germany. Published May 25, 1943.

A.P.C. 304,414. High pressure container. Emil Kopf et al., Dortmund, Germany. Published May 25, 1943.

Class 230—Gas Pumps and Fans

A.P.C. 205,992. Regulating devices for superchargers of internal combustion engines. Albert Stieglitz, Berlin-Spandau, Germany. Published May 25, 1943.

A.P.C. 227,468. Internal combustion engines. Fritz Egersdorfer, Berlin, Germany. Published May 25, 1943.

A.P.C. 290,346. Centrifugal fans. Ferdinando Ferre, Milan, Italy. Published May 25, 1943.

A.P.C. 321,834. Rotary blower. Bruno Heimbach, Stuttgart, Germany. Published May 25, 1943.

Class 234—Recorders

A.P.C. 291,698. Devices for the numerical fixing of the measuring figure of measuring instruments, particularly of pairs of scales. Sandor Toth, Budafok, near Budapest, Hungary. Published May 25, 1943.

A.P.C. 306,027. Printing device for scales. Alfred Sessler, Berlin-Adlershof, Germany. Published May 25, 1943.

Class 238—Railways, Surface Track

A.P.C. 364,319. Rail fastening. Valentin Retterath, Iversheim, near Munstereifel, Germany. Published May 25, 1943.

A.P.C. 401,901. Oblique junction-plane rail joint. Manlio Cipolla, Pavia, Italy. Published May 25, 1943.

Class 244—Aeronautics

A.P.C. 223,406. Helicopters. Raoul Hafner, Vienna, Germany. Published May 25, 1943.

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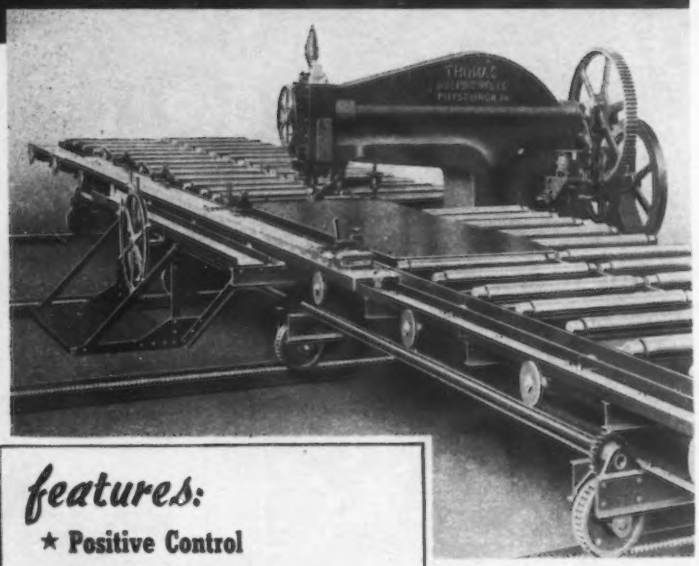

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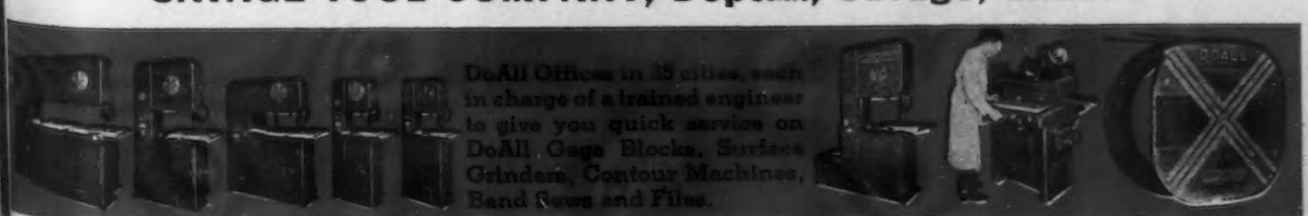
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A.P.C. 225,352. Covering for airplanes. Gustav Wilmanns et al., Wolfen (Kreis Bitterfeld), Germany. Published May 25, 1943.

A.P.C. 226,191. Propelling plant for aircraft. Claude Dornier, Friedrichshafen, Lake of Constance, Germany. Published May 25, 1943.

A.P.C. 231,882. Multimotor airplane. Claude Dornier, Friedrichshafen, Germany. Published May 25, 1943.

A.P.C. 235,640. Boundary layer control in aerofoils. Hendrik Karel Dominicus Van Den Bussche, Amsterdam, Holland. Published May 25, 1943.

A.P.C. 245,580. Aeroplane supporting wing. Joseph Ksoll, Breslau, Germany. Published May 25, 1943.

A.P.C. 252,299. Brake for aircraft. Claude Dornier, Friedrichshafen, Germany. Published May 25, 1943.

A.P.C. 254,867. Helicopter having twin intermeshing rotors. Anton Flettner, Berlin-Johannisthal, Germany. Published May 25, 1943.

A.P.C. 264,004. Stabilizers for aircrafts. Paul Aime Richard, Clichy, France. Published May 25, 1943.

A.P.C. 267,138. Device for heating surfaces of aircraft exposed to freezing. Otto Neumann, Frankfurt-on-the-Main, Germany. Published May 25, 1943.

A.P.C. 272,042. Aircraft control. Henrich Focke, Bremen, Germany. Published May 25, 1943.

A.P.C. 283,255. Driving means for air pumping devices on airplanes. Herbert Wagner, Dessau, Germany. Published May 25, 1943.

A.P.C. 283,962. Aircraft fuselage. Claude Dornier, Friedrichshafen, Germany. Published May 25, 1943.

A.P.C. 288,461. Retractable wheel mounting for aircraft. Charles Raymond Waseige, Rueil, France. Published May 25, 1943.

A.P.C. 288,462. Retractable landing gear for aircraft. Charles Raymond Waseige, Rueil, France. Published May 25, 1943.

A.P.C. 291,636. Construction of airplanes. Alfred De Muyser, Luxemburg. Published May 25, 1943.

A.P.C. 292,640. Automatic locking device for undercarriage. Jean Mercier, Neuilly-sur-Seine, France. Published May 25, 1943.

A.P.C. 297,773. Astronautic vehicle. Luigi Gussalli, Brescia, Italy. Published May 25, 1943.

A.P.C. 306,424. Aircraft construction. Otto Oeckl et al., Berlin, Germany. Published May 25, 1943.

A.P.C. 309,655. Supporting surfaces for aircrafts. Louis Bechereau, Paris, France. Published May 25, 1943.

A.P.C. 312,691. Automatic steering device for aircraft. Adam Kronenberger, Berlin, Germany. Published May 25, 1943.

A.P.C. 318,343. Devices for airchutes. Rene Tauty. Clichy, France. Published May 25, 1943.

A.P.C. 323,201. Aeroplanes and hydroplanes having folding wings. Emile Julien Eugene Dewoitine, Neuilly-sur-Seine, France. Published May 25, 1943.

A.P.C. 326,529. Devices for absorbing shocks especially for parachute. Rene Tauty, Clichy, France. Published May 25, 1943.

A.P.C. 326,648. Automatic steering devices. Waldemar Moller et al., Berlin-Zehlendorf, Germany. Published May 25, 1843.

A.P.C. 330,007. Landing gears with dirigible landing wheel. Pierre , Ernest Mercier, Neuilly-sur-Seine, France. Published May 25, 1943.

A.P.C. 335,573. Supporting elements for aircrafts. Louis Arsandaux, Orleans, France. Published May 25, 1943.

A.P.C. 337,848. Air transfer arrangements. Franz Villinger, Dessau, Germany. Published May 25, 1943.

A.P.C. 340,196. Parachute with variable surface. Giuseppe Liso, Spoleto, Italy. Published May 25, 1943.

A.P.C. 340,336. Aircraft wing. Emil Scheler et al., Vegesack, near Bremen, Germany. Published May 25, 1943.

A.P.C. 340,799. Exhaust gas pipe for airplanes. Alfred Hettich, Esslingenam-Neckar, Germany. Published May 25, 1943.

A.P.C. 342,756. Airplane landing gear. Jean Mercier, Neuilly-sur-Seine, France. Published May 25, 1943.

A.P.C. 357,045. Control device for varying the speed of parachutes during the descent. Giuseppe Lisi, Rome, Italy. Published May 25, 1943.

A.P.C. 358,731. Wing for aircrafts with a variable surface even during the flight. Giovanni Pelessoni, Udine, Italy. Published May 25, 1943.

A.P.C. 359,941. Control means for aircraft wing flaps. Carlo Gliubich, Milan, Italy. Published May 25, 1943.

A.P.C. 365,430. Rudder machines for automatic pilots. Adam Kronenberger, Berlin, Germany. Published May 25, 1943.

A.P.C. 366,353. Aeroplane float capable of being expanded and contracted. Toyosaburo

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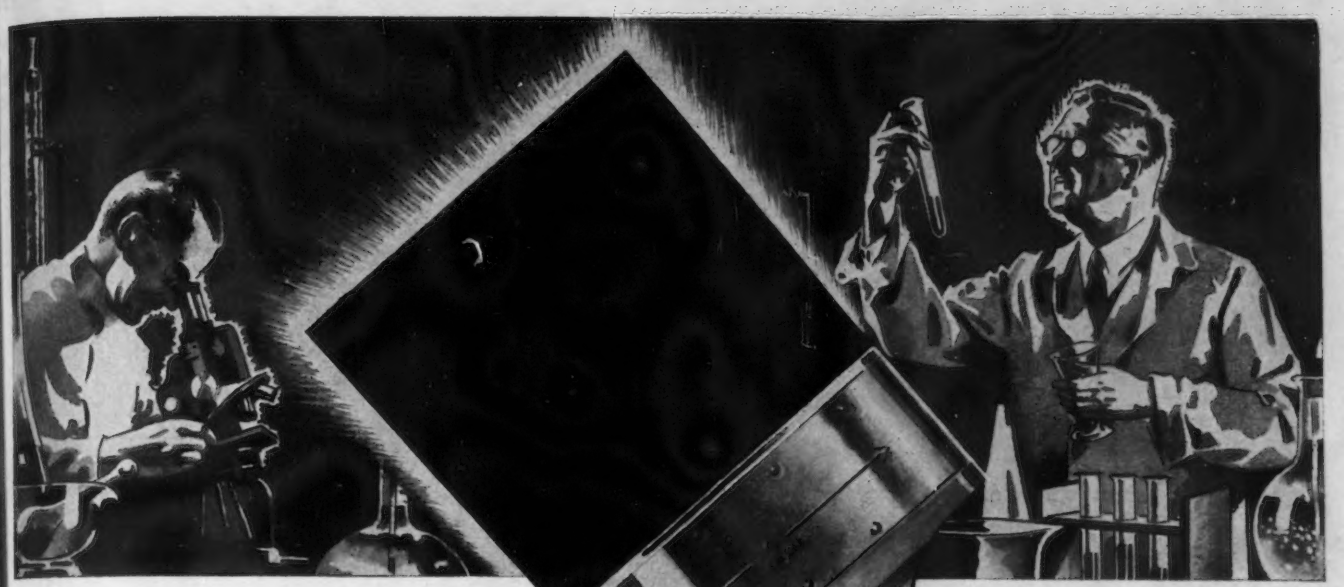

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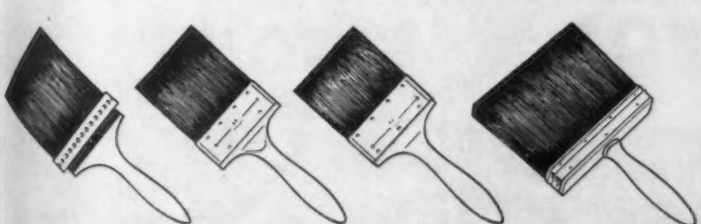

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Nakagawa, Shimonoseki, Yamaguchi-Ken, Japan. Published May 25, 1943.

A.P.C. 367,329. Automatic steering device for aircraft. Adam Kronenberger, Berlin, Germany. Published May 25, 1943.

A.P.C. 367,666. Reaction propelling device for aircrafts. Rene Anxionnaz et al., Paris, France. Published May 25, 1943.

A.P.C. 373,622. Means for influencing the conditions of flow, particularly for power plants in aircrafts. Heinrich Neumann et al., Munchen, Germany. Published May 25, 1943.

A.P.C. 373,714. Fighter planes. Rene Fonck, Paris, France. Published May 25, 1943.

A.P.C. 383,475. Aircraft wing. Rudolf Koch, Berlin-Grunau, Germany. Published May 25, 1943.

A.P.C. 388,039. Automatic piloting of marine or aerial vehicles. Marcel Louis Gianoli, Lyon, France. Published May 25, 1943.

A.P.C. 396,458. Aircrafts. Paul Aime Richard, Clichy, France. Published May 25, 1943.

A.P.C. 404,695. Aircraft plane. Ludwig Bolkow, Augsburg, Germany. Published May 25, 1943.

A.P.C. 404,951. Device for neutralizing the inertia of a vehicle body. Demeter A. Apostolou, Athens, Greece. Published May 25, 1943.

A.P.C. 430,821. Construction of retractable landing gear. Raymond Saulnier, Paris, France. Published May 25, 1943.

A.P.C. 430,970. Retractable tail landing gear for aircraft. Charles Raymond Waseige, Rueil, France. Published May 25, 1943.

A.P.C. 273,879. Girders for aircraft structure. Kurt Cyron et al., Dessau, Germany. Published June 1, 1943.

A.P.C. 319,988. Control limitating devices on aircraft. Roger Leger Marie Fernand Rouanet et al., Paris, France. Published June 1, 1943.

Class 248—Supports

A.P.C. 288,972. Resilient suspension of vibrating bodies. Maurice Francois Alexandre Julien et al., Paris, France. Published May 25, 1943.

A.P.C. 314,001. Means for resilient mounting of units. Manlio Marbetti, Milan, Italy. Published May 25, 1943.

A.P.C. 346,924. Fastenings of instruments. Fritz Nallinger, Stuttgart, Germany. Published May 25, 1843.

Class 253—Motors, Fluid

A.P.C. 293,043. Steam turbines and more particularly to a disc therefor provided at both sides with blades. Ernst Gente, Berlin-Siemensstadt, Germany. Published May 25, 1943.

A.P.C. 353,551. Gas turbine. Alfred Schutte, Augsburg, Germany. Published May 25, 1943.

A.P.C. 365,892. Bladed disc for radial flow rotary machines. Ulrich Meininghaus, Muelheim-Ruhr, Germany. Published May 25, 1943.

A.P.C. 373,008. Blade carrying rotors for axial flow rotary machines. Ulrich Meininghaus, Muelheim-Ruhr, Germany. Published May 25, 1943.

A.P.C. 373,058. Steam turbines. Ernst Gente, Berlin Siemensstadt, Germany. Published May 25, 1943.

A.P.C. 373,481. Turbine for steam, water and air. Alex Frederik George Glaser, Blimbing, Java, Netherlands, East Inries. Published May 25, 1943.

A.P.C. 379,610. Balancing the thrust of bladed discs in radial flow rotary machines. Ulrich Meininghaus, Muelheim-Ruhr, Germany. Published May 25, 1943.

A.P.C. 385,115. Elastic support of discs for radial flow rotary machines. Ulrich Meininghaus, Muelheim-Ruhr, Germany. Published May 25, 1943.

A.P.C. 385,333. Blade fastening for gas turbines. Alfred Schutte, Augsburg, Germany. Published May 25, 1943.

A.P.C. 385,334. Bladed gas turbine rotor made of ceramic materials. Alfred Schutte, Augsburg, Germany. Published May 25, 1943.

Class 257—Heat Exchange

A.P.C. 300,820. Heat exchange devices. Ste-

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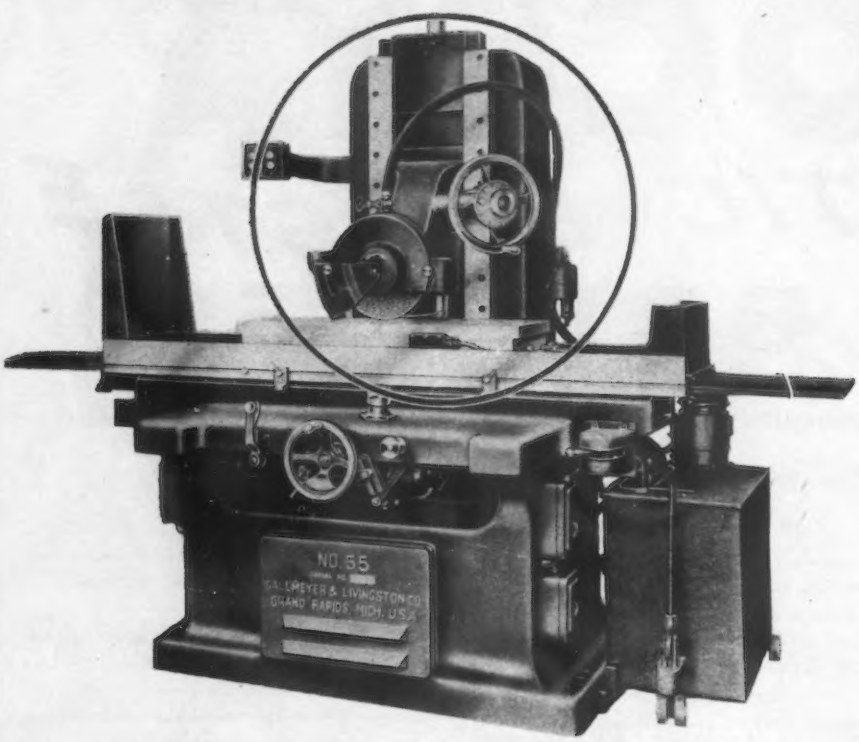

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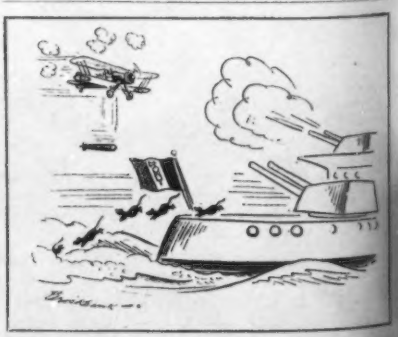

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fan Beck, Budapest, Hungary. Published May 25, 1943.

A.P.C. 353,344. Heat exchange device of the lamellate type. Stefan Beck, Budapest, Hungary. Published May 25, 1943.

A.P.C. 389,131. Heat exchangers. Rudolf Hintze, Berlin - Charlottenburg, Germany. Published May 25, 1943.

A.P.C. 402,669. Heat exchanger. Ernst Nanz, Stuttgart, Germany. Published May 25, 1943.

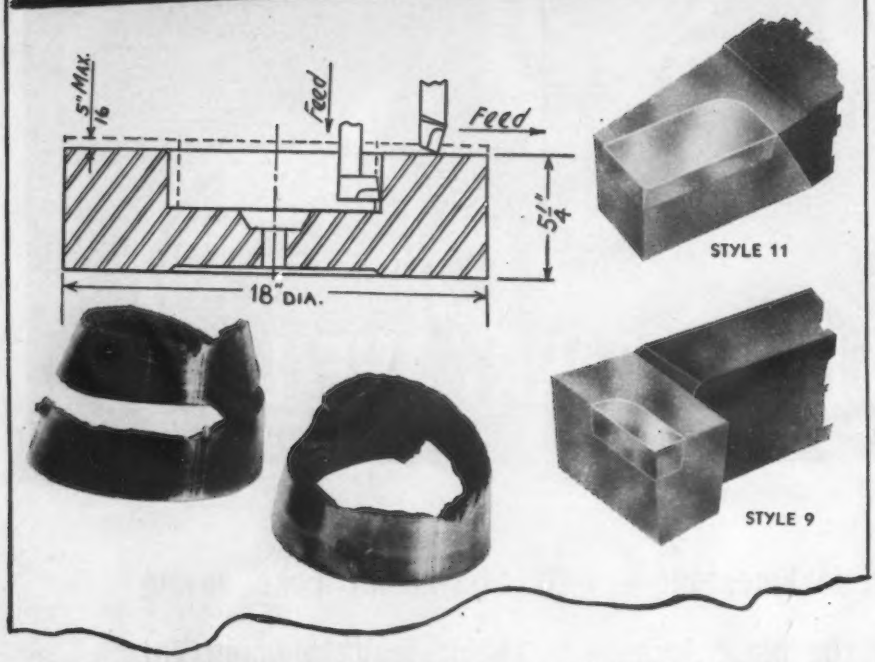
Class 266—Metallurgical Apparatus

A.P.C. 297,370. Method and apparatus for increasing the output of shaft furnaces, especially blast furnaces. Franz Bartschere, Duisburg-Hamborn, Germany. Published May 25, 1943.

A.P.C. 363,041. Method and device for directly producing pig iron and steel from ores. Julius Lohse, Berlin, Germany. Published May 25, 1943.

A.P.C. 402,253. Continuous metallurgical treatment of raw materials. Julius Lohse, Berlin-Wilmersdorf, Germany. Published May 25, 1943.

To Cut Sandy Steel Castings USE KENNAMETAL* CARBIDE TOOLS



★ On this machining operation tool life was very limited because the exceptionally hard sandy castings caused excessive tool breakage. KENNAMETAL was installed—the following data proves again the superiority of KENNAMETAL'S performance even under adverse conditions.

KENNAMETAL Style 11 tool was employed for the turning and facing and tool Style 9 was used for the boring operation. Chips produced are illustrated actual size. The 18" casting was turned and faced at 148' per minute with a 5/16" depth of cut and a feed of .068". At this feed KENNAMETAL finished 3 castings before tools showed appreciable wear.

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Modifications and Additions to Patent Laws Recommend

• • • The National Patent Plann Commission, headed by Charles Kettering, has issued its report the American patent system aft long study dating back to Dece ber, 1941, when an executive or was issued establishing the Co mission. The summary of findin and recommendations follows:

1. The Patent System.

The Patent System is the foundation American enterprise and has demo strated its value over a period coexte sive with the life of our government. T principle of recognizing a property rig in intellectual creation is sound a should be continued as contemplated the Constitution.

2. Patents and the War Effort.

Although full opportunity has be given, and specific inquiry made by t Commission of the armed services, no ev dence has been submitted of specific in stances of the use of patents to hamp the war effort.

3. Protection of the Public Interest.

To expose secret, improper or illeg agreements, it is proposed that all pate agreements be recorded with the Unit States Patent Office.

It is proposed that in a suit for in fringement, a patent owner shall be lim ited to reasonable compensation witho prohibiting the use of the patented inve tion whenever the court finds that manu facture of the invention is necessary the national defense or required by t public health or public safety.

To invalidate patents which later info mation shows should not have been i sued, a provision is proposed for cance lation of an issued patent.

4. Extending the Use of Patents.

It is recognized by the Commission th our system should afford a patent own an opportunity of publicly declaring h willingness to grant licenses under rea sonable terms. A public register of su patents in the Patent Office is therefo proposed.

5. Uniform Standard of Invention.

One of the greatest technical weak nesses of the patent system is the lac of a definitive yardstick as to what invention. To provide such a yardstic and to assure that the various courts law and the Patent Office shall use th same standards, several changes are sug gested. It is proposed that Congress sha declare a national standard whereby pa entability of an invention shall be dete mined by the objective test as to i advancement of the arts and science It is further proposed that when th validity of a patent is challenged in infringement suit the court record sha be referred to the Patent Office for i opinion in the light of any new eviden or facts developed during the tri Finally, it is proposed that a single cou of patent appeals be established.

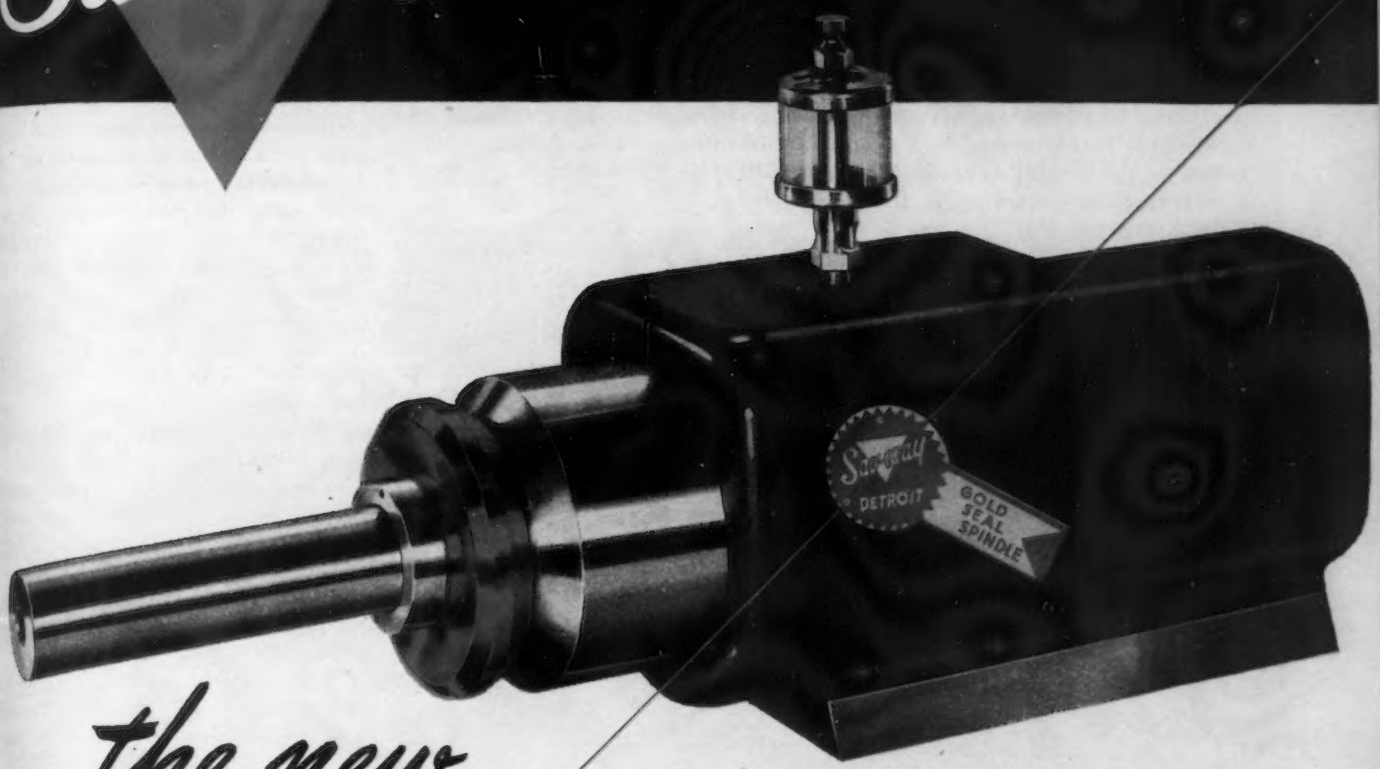
6. Early Termination of Patent Grant.

A patent application can be delay and kept pending for undue and pr longed periods. This postponement of th beginning and ending of the patent ter is not in the public interest. It is pr posed that the patent term shall not e dure more than twenty years after th application is filed. The present term seventeen years would be retained exce in those cases where more than thr years were consumed in obtaining a pa ent. Delays of more than three years the prosecution of an application for pa ent would result in a corresponding sho ening of the seventeen year term.

7. Simplification of Appellate Procedure.

When a patent is refused by the Pa ent Office the inventor now has relief the form of review by either of t courts. This is both confusing and u necessary. It is proposed that the Co of Customs and Patent Appeals be des nated as the sole reviewing body upo the denial of a patent by the Pate Office.

Sav-way announces



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In the Gold Seal Spindle an ingenious modification of the oil intake admits an air-oil mist, through filters, to the body around the shaft. This lubricating mist is constantly drawn through the moving parts, fore and aft, by the pumping action of the exclusive Sav-Way centrifugal labyrinth seals. This flow automatically excludes dirt and coolant from the spindle.

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Canada Rated As Greatest Base Metal Exporting Country in World

Ottawa

• • • **Canada** is rated as the greatest base metal exporting country in the world and is fourth among the United Nations in the production of steel and of war supplies, according to C. D. Howe, Minister of Munitions and Supply. Only about 30 per cent of her war production is delivered to the Canadian forces at home and abroad. The remainder goes to Britain, the United States, India, Africa, China, Australia, New Zealand and the South Pacific.

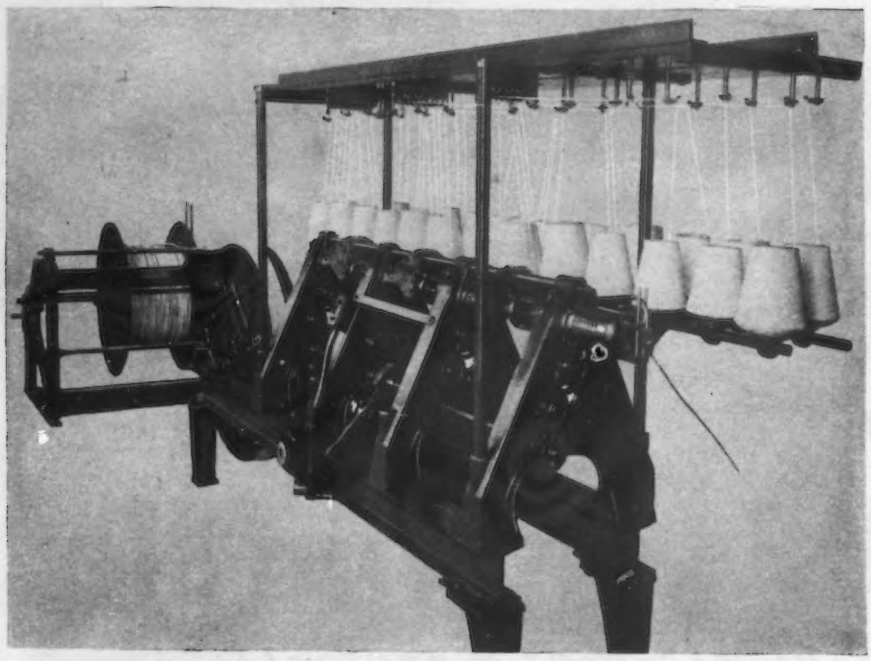
Arms sent to China include Canadian 25-pounder, Bren and Boys anti-tank guns, rifles, and ammunition for these weapons. "We expect to ship many additional types of equipment now that the Mutual Air Board is operating," Mr. Howe said. "Canada has sent Russia more than 1400 tanks, more than 2000 Universal carriers, and naval, Bren and anti-tank guns. We have provided the Russians, too, with ammunition for heavy guns and small arms. In addition, to Russia have gone machine tools, boots, gloves, textiles, clothing and personal equipment, as well as shipments of the five metals most urgently required for the Russian war program."

To the United States she has shipped components of various munitions, ammunition, secret electrical devices and base metals. More than 80 per cent of her output of automotive transport has gone to Britain, Egypt, India, the Middle East, the Near East, the Far East, Australia and New Zealand. To the Empire, Africa, Australia and New Zealand have been shipped armored cars, guns, heavy ammunition, small arms, anti-aircraft guns, bombs, anti-tank mines and small arms ammunition. We have begun the manufacture of 145 military locomotives for India, the Minister said. Canadian-made rifles are in use in Africa, Iraq, New Zealand, Australia, India and many other places. Canadian-made aircraft have long been in combat service and Canadian-made machine guns have been blasting German, Italian and Japanese planes on all fronts. Other equipment shipped throughout the world includes bomb throwers, Sten guns, parachutes, flare chutes, artillery and a long list of instruments.

Total dollar value of Canada's equipment deliveries to date exceeds $4,500,000,000, and more than 900,000 men and women are employed in war industry. "We have launched 500 ships and delivered 8000 aircraft, 475,000 motor vehicles, 24,000 fighting vehicles, 55,000 heavy gun barrels or mountings and 630,000 small arms," Mr. Howe stated. "We have produced 800,000 tons of chemicals and explosives, and instruments and communications equipment to the value of $160,000,000."

Late in 1942 Canada was delivering in substantial quantities every item of war equipment for which orders had been received in the first two and a half years of war. Every week we are launching 6 or more vessels, turning out 80 planes, producing 4000 motor vehicles and 450 fighting vehicles, making 940 heavy guns, barrels or mountings, turning out 13,000 smaller weapons, and producing $4,000,000 worth of instruments and communications equipment, the Minister added.

He expressed confidence that there



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Knits two or three cotton coverings on bare wire up to #6 gauge—also flat or shaped, continuous-strip material, 1200 to 1500 feet per hour. Saves rubber since cotton coverings, impregnated, form excellent insulation. Straightening rollers operate horizontally and vertically. Each head knits one cover. 20″ or 36″ capstan take-off—separate haul-off reel stand, 40″ O.D., with traverse mechanism, 1000 lb. capacity.

Other advantages include: automatic electric stop motion on each yarn; improved knitting head and needle design; knits direct from large cones; quiet operation reduces operator fatigue.

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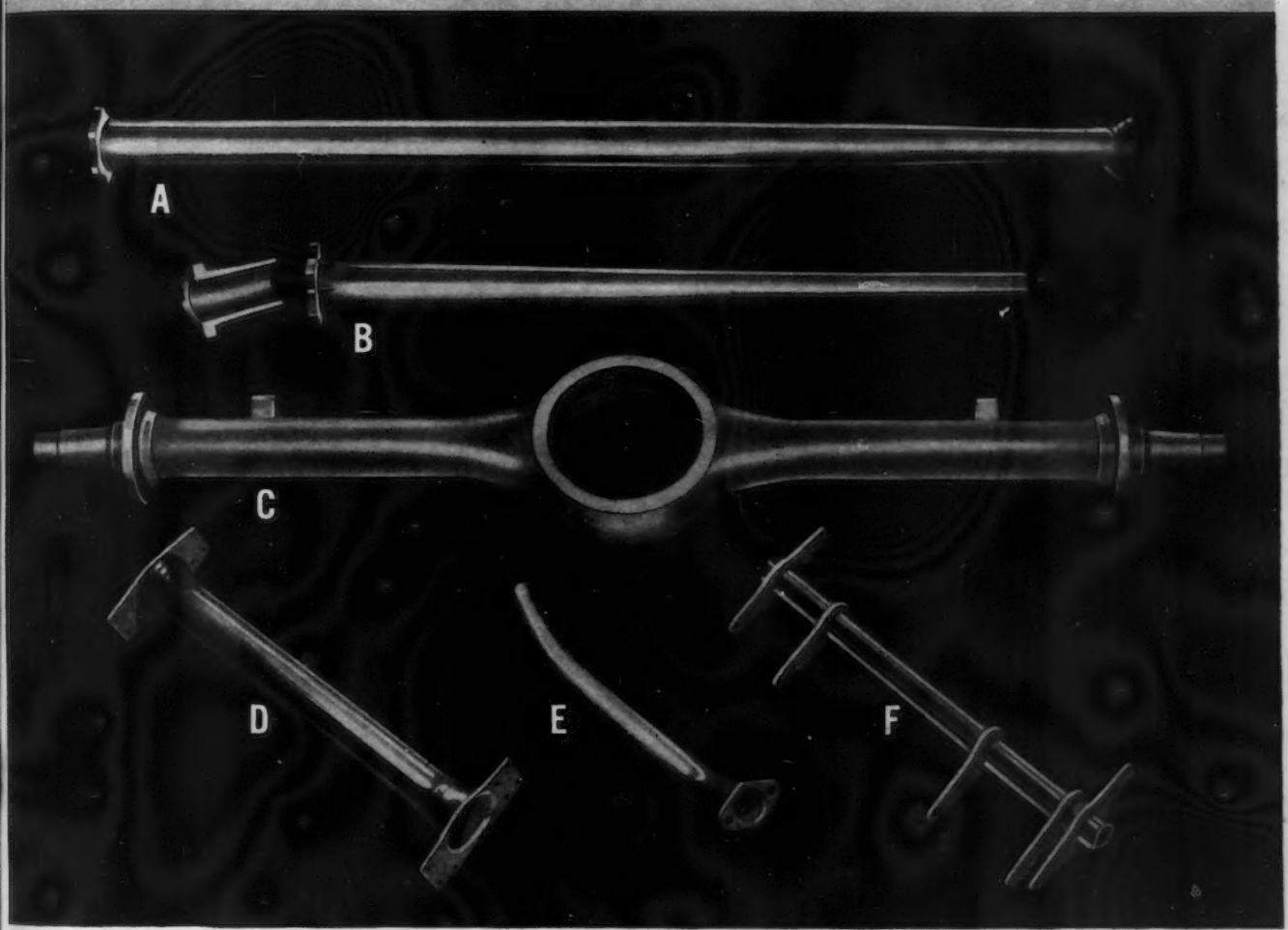

DESCRIPTION OF PARTS: A—One Piece Torque Tube. B—Torque Tube. C—Rear Axle Housing. D—Frame Rear Cross Tube. E—Spare Wheel Carrier Arm. F—Brake Cross Shaft.

We are serving transportation manufacturers in war, as in peace, with quantity produced welded-steel tubular parts made by the hot and cold process . . . upsetting, forming, swaging, forging, welding, heat treating and machining.

AMERICAN METAL PRODUCTS COMPANY, 5959 LINSDALE AVE., DETROIT, MICHIGAN

would be "no break in Canada's production front" while the war lasts, even though shortages of manpower have developed, particularly in coal and base metal mining, in forest and construction industries, and in common labor for steel mills and allied industries.

Canada's steel industry has been doubled since the war began, making her the fourth greatest steel producer among the United Nations, exceeded only by the United States, Great Britain and Russia.

"We have created a great ammunition industry," he continued. "At the close of 1942 we were making 28 types of shells of 15 different calibres, ranging from the 40-mm. quick firing shell to the 7.2 howitzer . . . Our present production of chemicals and explosives is at a rate of 10,000 tons a week. One of these products is the most powerful explosive developed anywhere during the present war. The production of this secret explosive is being increased."

Against curtailed output of various types of guns, he stated that output of naval guns will be substantially increased, along with a wide variety of other naval equipment. The Dominion is now producing in quantity 20 or more components of naval torpedoes.

"At no time has there been a serious single interruption in the operations of a munitions plant or a vital industry owing to lack of steel," Mr. Howe declared. "Despite an enormous increase in our requirements, we are now dependent upon the United States for only one-third instead of nearly one-half of our supply.

"Production of alloy steels is now nearly five times as great as in 1939. In 1939 our output of steel ingots was under 1,500,000 tons; in 1940 just over 2,000,000 tons; in 1941 just over 2,500,000 tons; in 1942 almost 3,000,000 tons. At the end of 1943 we will be operating at the rate of more than 3,000,000 tons a year.

"New rolling and finishing mills of the most modern type have been equipped and are in operation. Two new plate mills have helped to increase production of plate to nearly 300,000 tons more in 1942 than in 1939. Most of this has gone into building cargo ships and fighting ships. Shell steel production is now set at about 250,000 tons a year. We are using over 500,000 tons of steel yearly to make tanks and other army vehicles.

"Steel foundry capacity also has been expanded. The output of castings has risen from 61,000 tons in 1939 to 160,000 tons in 1942.

"For 1943 the steel requirements of Canada are estimated at nearly 5,000,000 tons, of which domestic mills will supply more than 3,000,000 tons. We have built the two largest blast furnaces in the British Empire. One is not quite finished, but during the summer our pig iron output will be at the rate of over 2,500,000 tons per year—nearly four times as much as in 1939."

War Output Revised

Toronto

• • • Canada's revised war production program has resulted in curtailed output of a number of defensive weapons and equipment. Many war plants have slipped off from their peak production records attained early this year. A number of companies are engaged in re-tooling for production of new types of offensive weapons and this work will take three or four months and it is not expected they will return to full operations until some time in last quarter. Arrangements are proceeding, and in some instances have been completed, for speed-up in production of offensive equipment including ships, aircraft, and new types of guns.

While cancellations and suspensions in some war production are being offset by increased activities in other types, a number of plants have been seriously affected by loss of contracts and have reduced operations to a minimum. There seems to be doubt as to the possibility of many plants that have lost contracts again getting back into full production on the war account. Curtailed operations have been reflected in reduced demand for some lines of finished and semi-finished steel and recently a number of consumers have found surplus stocks on their hands.

What hard-facing stands heat best?

Coast Metals Hard-Faced bit at left.
Unfaced bit at right.

THIS TONG BIT TEST WILL TELL YOU AT ONLY A FEW PENNIES' COST...

JUST APPLY to one of your stripper or soaking pit tong bits the recommended Coast Metals Hard-Facing. Then do the same to the other bit. But here use some other brand of hard-facing metal. Or, if you prefer, leave this second bit uncoated.

Result: You'll find Coast Metals *wins in lengthening tong bit life* at high temperatures. In one case, Coast Metals hard-faced bits pulled 75 heats of 22 ingots, each weighing 4,000 pounds,—a total of 6,600,000 pounds all together. Ordinary bits wore out after two or three heats! In another case, Coast Metals Hard-Facing increased the life of slabbing mill tong bits SIX TIMES!

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3 WAYS!

-1-
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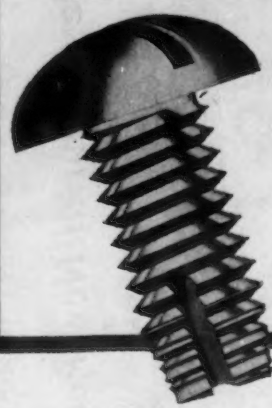
-2-
Thus — it does away with the buying of taps

-3-
And . . . the maintenance of taps!

SHAKEPROOF Thread-Cutting Screws



Type 1 for metal applications

ARMY E NAVY

plus . . . its ability to provide a stronger, tighter fastening than is ordinarily possible with machine screws in pre-tapped holes.

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Magnesite Output at New Peak in 1942

• • • **Mine output** of domestic crude magnesite in 1942 reached the all-time high of 497,368 short tons, an increase of 33 per cent over the 1941 production of 374,799 short tons, according to the Bureau of Mines. Increased requirements of basic open-hearth steel furnaces for dead-burned magnesia refractories was the chief factor in the record magnesite output, but demand for caustic-calcined magnesia in plastic magnesia flooring and magnesium metal manufacture also stimulated production.

Sales of dead-burned magnesite increased in 1942, exceeding the record 1941 shipments. The bulk of the output was consumed in the construction and repair of basic open-hearth steel furnaces, though some of the purer material was used in brickmaking. An impending shortage of magnesite brick was alleviated by increased use of periclase with chrome ore to form the "kromag" type of brick, said to be interchangeable with or even preferable to all-magnesite brick in certain areas of open-hearth steel furnaces.

Shipments of dead-burned dolomite in 1942, stimulated by requirements of the steel industry, were 15 per cent greater in quantity than the record levels attained in 1941.

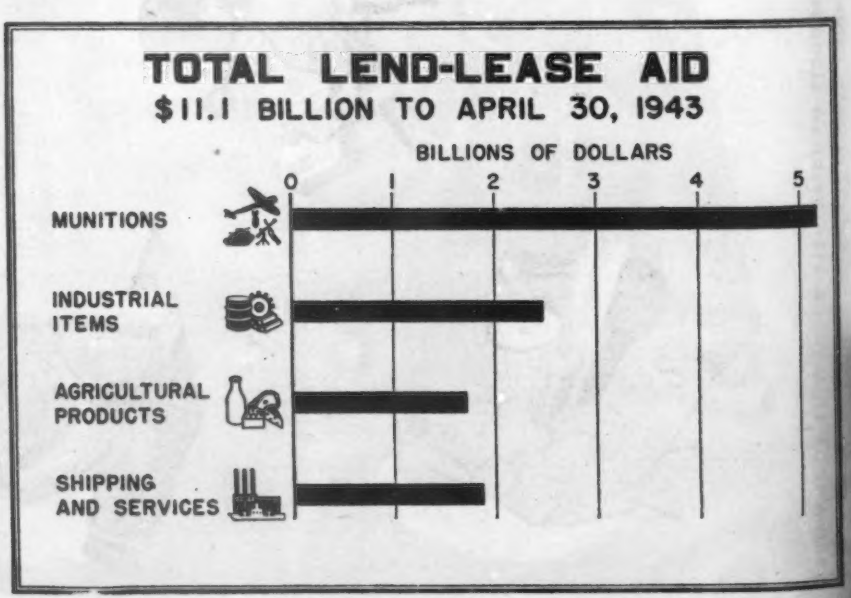
Dolomite has long been used as a basic refractory for open-hearth maintenance and repair, averaging 5 to 8 times the quantity of magnesite used for refractory purposes. Only recently, however, has dolomite invaded the metal field, competing with and supplementing magnesite and brines as a source of magnesium metal and magnesium compounds.

The production of precipitated magnesium carbonate, magnesium chloride, magnesium sulfate, and magnesium hydroxide from magnesite, dolomite, sea-water bitterns, raw sea water, well brines, and dry-lake brines in 1942 was reported to the Bureau of Mines as 362,892 short tons valued at $14,238,364, compared with 103,906 tons valued at $3,288,687 in 1941. Part of the increase in the 1942 figure was caused by general expansion in output of virtually all magnesium compounds, especially magnesium chloride, and part was due to the inclusion in 1942 data of precipitated magnesium carbonate from dolomite, which was not included in the 1941 figures. In neither year do the figures include the magnesium sulfate derived from magnesite.

Steel Construction Institute Surveys Light Weight Alloys

New York

• • • **As an indication** of the trend of the times, the American Institute of Steel Construction has just issued a technical bulletin No. 194, entitled "Applications of Structural Steels and Light Weight Alloys for Bridges, Buildings and Similar Structures." Prepared by F. H. Frankland, director of engineering, it contains chapters on the forming, riveting, welding and corrosion resistance of aluminum, magnesium and stainless steel for structural applications as well as data on low alloy structural steels and sheet steel for structural purposes.



CONTINENTAL CASTINGS IN AIRCRAFT PRODUCTION

THE increasing flow of aircraft from parts to finished planes is being accomplished through advanced production methods in this great industry

Continental is contributing much to this effort in supplying steel castings that make up the production tools behind the front. Large castings are being produced for hydraulic and power presses, which shape many aircraft parts in less time compared to former methods. These are highest quality castings made to withstand the tremendous operating conditions to which they are continually subjected. Castings on extrusion presses, drop hammers and forming presses are only part of our service to the aircraft industry.

In addition, Continental castings are serving on many types of machinery required in the manufacture of aircraft materials, from mines to the building of airports.

Continental's alloy rolls are making possible ever-increasing production of aircraft metals from mills throughout America.

Other Continental products include steel and alloy steel castings, special machinery and rolling mill equipment for the steel industry.

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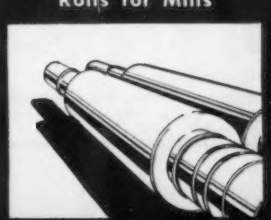
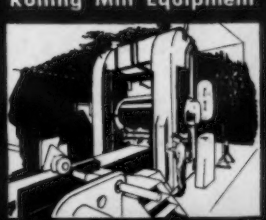
Rolls for Mills

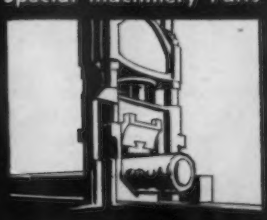


Rolling Mill Equipment



Steel Castings for Presses

Special Machinery Parts



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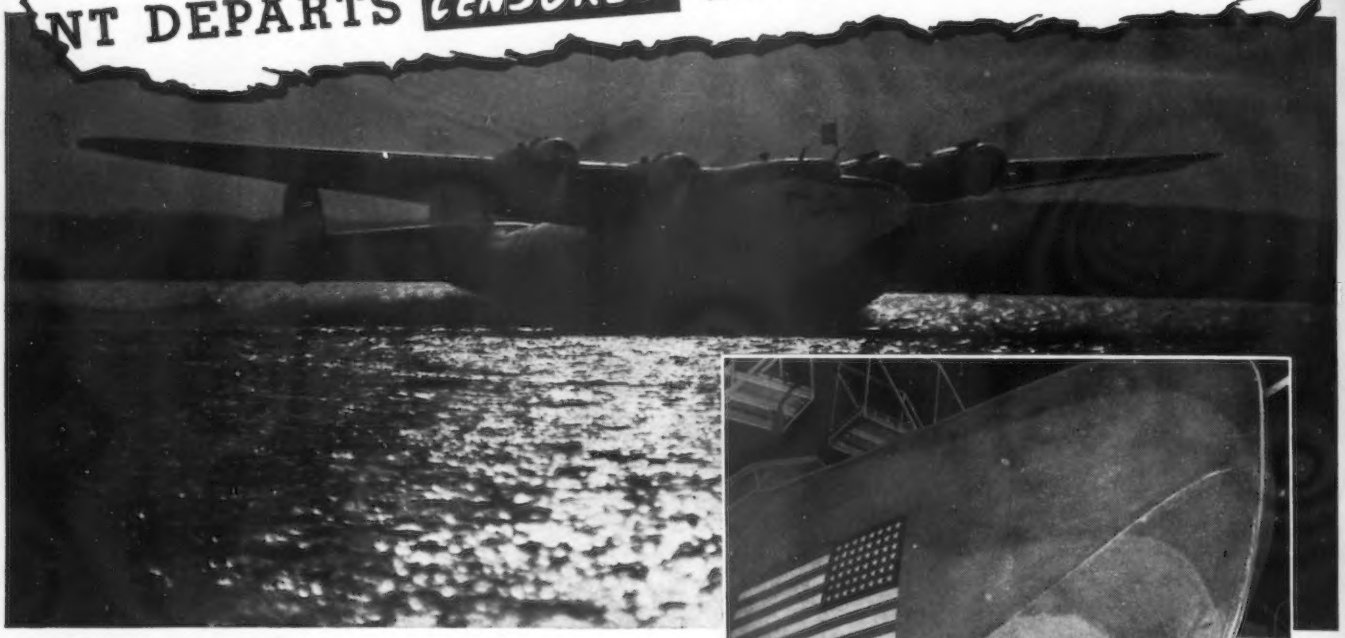

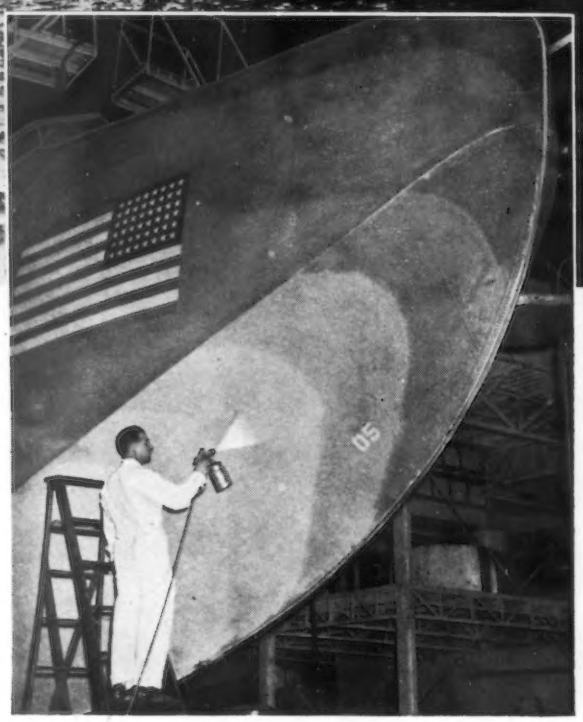

BEFORE PEARL HARBOR every take-off and every landing of a Pan American Clipper was an awe-inspiring sight that attracted great crowds of people.

But now Pan American Airways' giant Clippers often arrive and depart secretly under cover of darkness —unannounced, unseen, unheard. Because at times they fly through war zones, windows are blacked out and radios are silent when in these danger areas. And at Pan American maintenance shops the same DeVilbiss Spray Guns that were once used to keep the trim silver flying boats bright and shining are now used to camouflage them from nose to tail.

Famous for their insistence on only the *very best* in materials and equipment, Pan American selected DeVilbiss Spray Systems for exterior and interior painting long before the war. And Pan American has since learned to depend on DeVilbiss guns for efficient, time-saving performance on such additional aircraft maintenance jobs as caulking seams, cementing fabric parts, cleaning motors and fuel lines.

Everywhere in war production today DeVilbiss Spray Systems are helping American industry win the Battle of Time. And when the Victory has been won you will find DeVilbiss ready with better-than-ever Spray Equipment that will bring new speed and efficiency to any finishing, painting or coating operation your peacetime products may require.

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Mexico Boosts Mine Output to Record

Washington

• • • **Mexico has** stepped up mineral production sharply in the last year, according to the Board of Economic Warfare.

The expansion of Mexico's mineral production is proceeding under the agreement signed with the U. S. about a year ago for development of strategic resources. This arrangement, in turn, carries out recommendations of the Rio de Janeiro conference of American Foreign Ministers for mobilization of hemisphere resources.

The United States is aiding in the improvement of key Mexican rail lines to handle the increasing movement of metals and ores to the U. S. war industries, and, as the chief taker of Mexico's mineral output, also is helping with loans, technical advice and other forms of cooperation in the mining expansion. Among minerals moving to the U. S. as the result of expansion of Mexico's mining industry are zinc, manganese, antimony, tungsten, copper, fluorspar, mercury and graphite—all vital to war production.

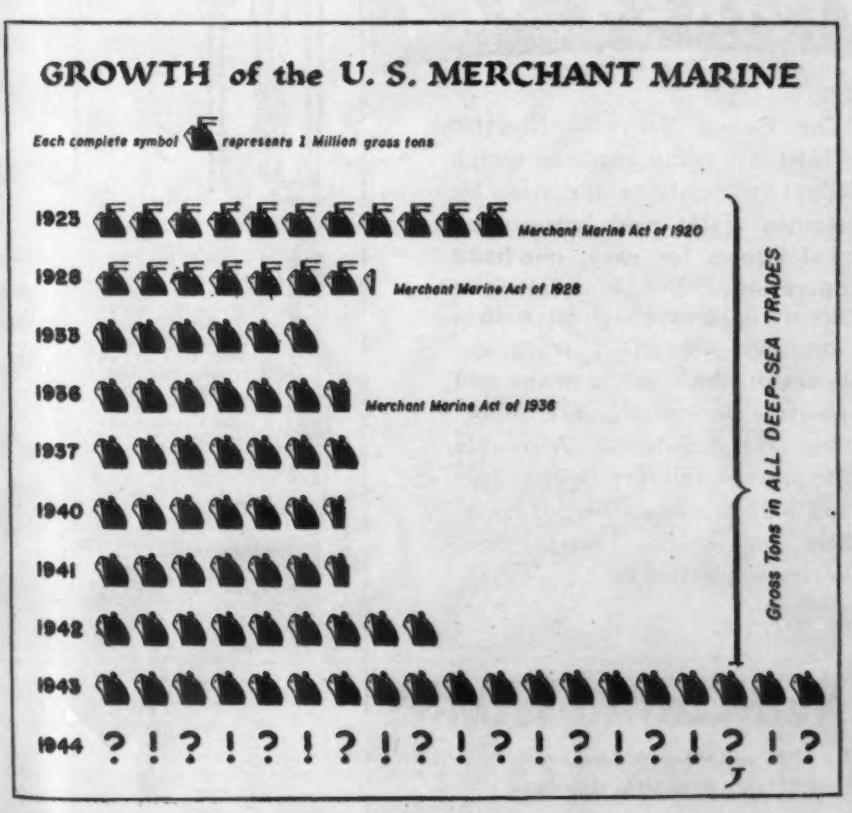
Since the start of the war, Mexican tungsten production has increased substantially. Much of it is obtained from small, scattered mines in the Northwest section of the country, by "gambuscinos," or very small operators. A small concentration plant has been set up at Nogales. Any ore below 30 per cent in tungsten oxide is concentrated there. The rest is sent to Long Island, for processing.

First Phase at Steep Rock To Be Completed in October

Atikokan, Canada

• • • **Steep Rock Iron Mines** has revealed that the first phase of the U. S.-Canadian development program, launched recently to bring into production the high-grade iron ore at Steep Rock Lake, is expected to be completed in October. Three bodies of hematite ore, low in impurities and suited to open hearth as well as blast furnace use, have been located in the bottom of the lake.

The first phase consists of bypassing the system around the section of the lake in which the ore bodies lie. The second phase is the pumping of Steep Rock and open-pit mining of the peak points of the deposits.



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Make sure *now* that your Kinnear Rolling Doors are delivering the full measure of efficiency originally built into them. You'll not only aid war production with time-saving door operation—you'll also add *extra years of low-cost service* to the advantages your Kinnear Doors offer. A guide to help you make a quick, thorough check of the reconditioning your doors need will be mailed on request.

KINNEAR ROLLING DOORS

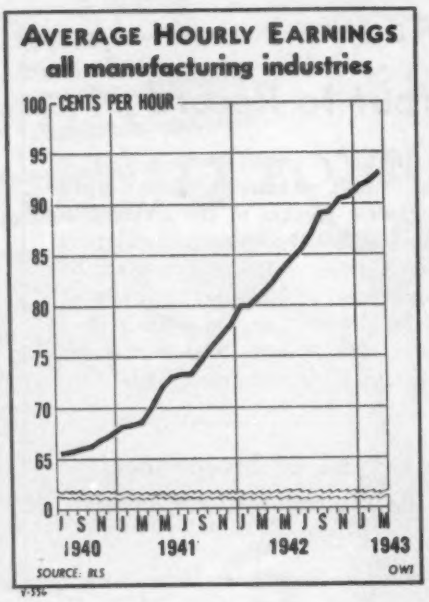
Wage Ruling Clarifies Permitted Increases

Cleveland

• • • **General Order 31**, recently adopted by the National War Labor Board, tightened the restrictions around individual wage and salary increases which may be made without WLB approval. For the first time definite rules have been laid down under which increases may be made to individuals within rate ranges. The order, amending General Orders 5 and 9, regulates how much the increases may be, how frequent, and to how many employees, without obtaining approval of WLB.

Individual increases may be made without WLB approval, if they conform to a wage or salary rate schedule which: (1) has been specifically approved by the WLB; (2) is contained in a collective bargaining agreement in existence on May 31, 1943; or (3) conforms to the employer's practice prior to Oct. 27, 1942.

If employers do not have a plan for making individual adjustments, they can either apply to the WLB for approval of a plan or they can make adjustments in accordance with the following:



(1) Merit increases: These can be made only within rate ranges for the job and must be governed by WPB preestablished standards;

(2) Automatic length of service increases: Can be made only within rate ranges for the job and must be governed by WLB standards;

(3) Promotions or reclassifications: According to WLB standards.

(4) Apprentice and trainee plans: Governed by WLB standards.

The General Order 31 also sets forth certain records which must be kept by the employer for a period of two years regarding application of such a salary or wage schedule and the increases made under it. The order also states the requirements for establishing new schedules for individual rate adjustments. An employer desiring to change one or more provisions of his established or approved rate schedule may obtain consideration of the changes from the Regional WLB for determination, or may ask the Regional WLB to refer the matter to the National Board.

Where there is a duly recognized or certified labor organization which represents any or all of the employees included in a proposed schedule, approval must be jointly requested by the employer and such labor organization. If agreement cannot be reached by the parties on any point, they may jointly submit the issues to the Regional WLB for determination or may ask the Regional WLB to refer the matter to the National Board.

Bookings of Fabricated Structural Steel Decline

• • • **Bookings** of fabricated structural steel for the month of May, according to reports received by the American Institute of Steel Construction, Inc., amounted to 28,338 tons, as compared with 161,039 tons for the corresponding month last year. The decline in bookings has been consistent since last June and reflects WPB limitation orders on the use of structural steel and a tapering off of the construction program.

Shipments declined to 86,491 tons from 96,506 tons for the preceding month. Tonnage available for future fabrication at May 31 was 306,580 tons.

Here's Safe Easy Strength... FOR THE WEAKER SEX

The Conco Torpedo Electric Hoist has many features which adapt it ideally to operation by women. First, push button control allows for easy, one-hand operation. Double cast iron drums balance the load with a minimum of effort from the operator. An electric brake and positive limit switch are important safety features. Available for prompt delivery in 250,- 500- and 1000-lb. capacities for hook, bolt or trolley suspension. Write for bulletins.

CONCO ENGINEERING WORKS
Division of H. D. Conkey & Company
15 GROVE STREET, MENDOTA, ILLINOIS

Illustrating four units of Conco's complete line of hand - powered and electric cranes, hoists and trolleys. Write for bulletins on the equipment needed.

AMERICAN *Aircraft Motors*

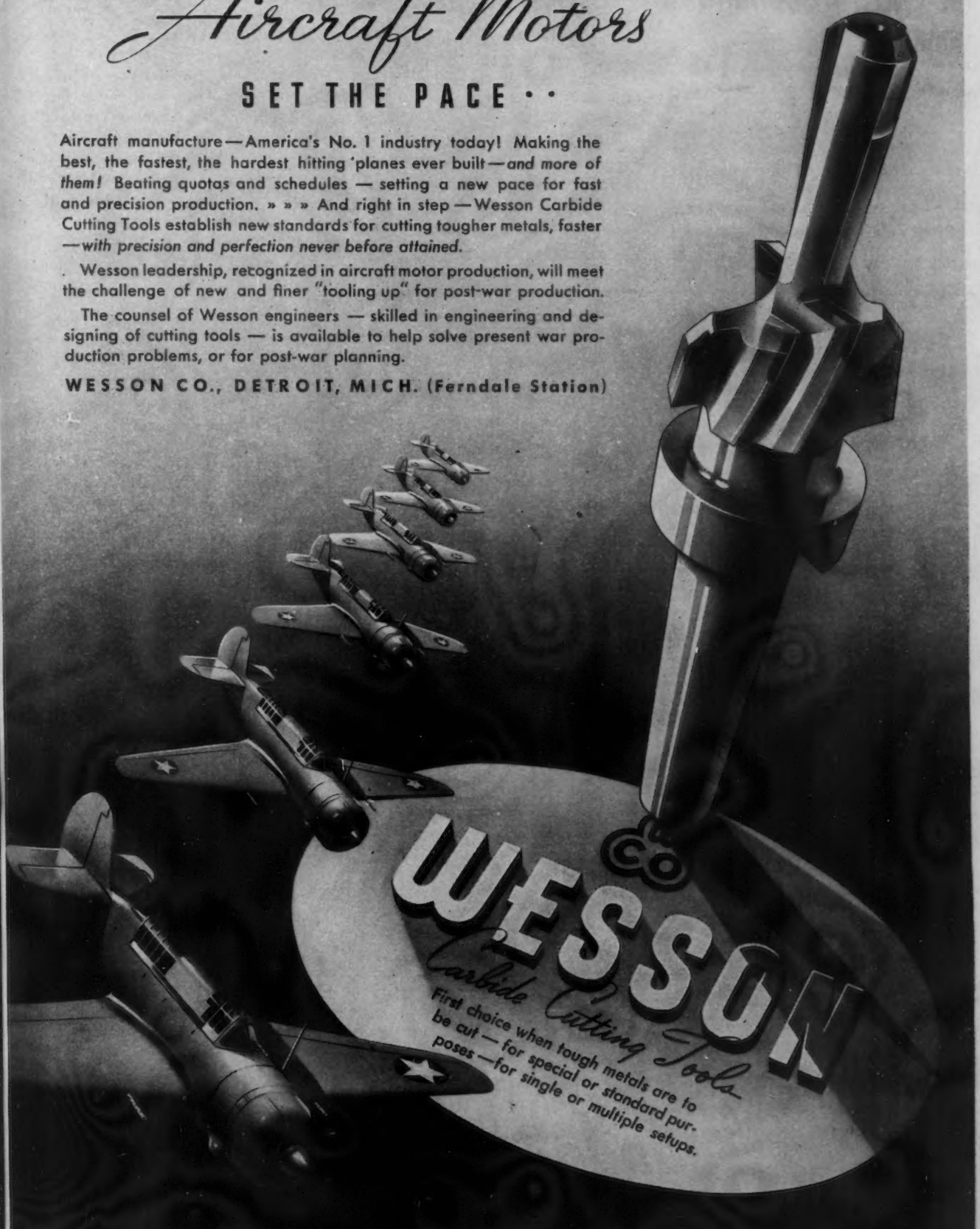
SET THE PACE ··

Aircraft manufacture—America's No. 1 industry today! Making the best, the fastest, the hardest hitting 'planes ever built—*and more of them!* Beating quotas and schedules — setting a new pace for fast and precision production. » » » And right in step—Wesson Carbide Cutting Tools establish new standards for cutting tougher metals, faster —*with precision and perfection never before attained.*

Wesson leadership, recognized in aircraft motor production, will meet the challenge of new and finer "tooling up" for post-war production.

The counsel of Wesson engineers — skilled in engineering and designing of cutting tools — is available to help solve present war production problems, or for post-war planning.

WESSON CO., DETROIT, MICH. (Ferndale Station)


WESSON
Carbide Cutting Tools
First choice when tough metals are to be cut — for special or standard purposes — for single or multiple setups.

WHEN IT'S OVER "Over There" we'll all have a higher standard of living "over here." Better vacuum cleaners, refrigerators and washing machines—better cars, trucks, planes, bicycles —better tractors, plows and other farm machinery. Industrial plants will have better tools and better machines.

They will all serve better, last longer, cost less and be safer. One important reason is that Wesson Carbide Cutting Tools will enable the manufacturers of all these products to use more durable, tougher metals — insure greater precision and perfection — and at the same time cut costs by saving production time.

New Era in Laminated Plastics Seen

Cincinnati

• • • **Wartime research developments** in laminated plastics being applied to vital military uses will open a new era of peacetime consumer applications, three representatives of the Formica Insulation Co. disclosed at a recent annual meeting of the Ohio Mechanics Institute.

John C. Pitzer discussing modern developments in industrial laminated plastics told the assembly that while paper and cotton fabrics have been used for fillers since the beginning of the laminated plastics industry, more recently fillers such as wood veneers and glass fabrics have come into use to provide new and interesting properties.

J. D. Cochrane, Jr., another Formica engineer, discussed details of decorative Formica. Cochrane explained that the technique developed for making decorative peacetime products such as radio panels and table tops has been applied to making vital control panels, instruction charts and nameplates for the war production program and developments in this field are preparing us for an even broader application of Formica in the post-war picture, by virtue of improved processes of manufacture and improved products.

Examples of these developments listed by Cochrane were:

1. Application of new methods of heating to the drying of impregnated material leading to more rapid production and an improved product, particularly in the field of translucent materials.
2. Use of melamime-formaldehyde resin in laminates, producing materials of improved chemical and physical characteristics as compared to the earlier urea-formaldehyde products.
3. Application of improved processes of curing heat-reactive-laminates to produce products which have greater heat resistance and dimensional stability.
4. New methods of fabrication to produce Formica assemblies which have improved physical characteristics.

Expressing belief in the post-war applications of plastic materials in the fields of industrial, architectural and commercial design, G. F. Schatz related that at the present time there are many materials in the process of development which are expected to be completed within a very short time. One is a flexible wall material which will be applied in a manner similar to linoleum or wall paper. Another is a semi-structural panel with an abrasive finish which will be used as a safety flooring in many applications in the fields of transportation.

He also said that considerable research and development along the lines of lightweight, load-bearing wall section with integral insulation, having a weather resistant finish on the outside and a colorful or decorative finish on the inside, will be a post-war application.

"Looking somewhat further into the future," Schatz related, "we see the so-called 'packaged' kitchen and bathroom complete with molded sanitary equipment. New resins and new molding techniques have been worked out for molding impregnated pulp and laminations into large forms, giving a material with a dense and smooth finished surface while the core remains relatively loose and coarse in structure."

HIGH-SPEED PRODUCTION + CLEANING

THIS is a war of men against metal. Of machine against machine, and of metal against metal.

Metal cleaning is an important part of all present-day manufacture—whether it is machine guns, airplane parts, cartridge cases (brass and steel), A. P. and H. E. shot, or ammunition boxes. Ammunition and equipment cannot be put into service faster than the component parts can be cleaned.

In these swift-moving times Wyandotte Field Engineers are on call twenty-four hours a day. They are constantly in the field—working with those in charge of metal degreasing in the arsenals and the production shops of the nation.

If you have a problem in metal cleaning, the chances are that a Wyandotte man has met that problem, or its twin brother, in the course of his daily work. He will be glad to work with you to obtain improved results, increased speed, or lower costs.

Many times Wyandotte has solved all three problems at once. We are ready to help you NOW!

Wyandotte

SERVICE REPRESENTATIVES IN 88 CITIES

WYANDOTTE CHEMICAL CORPORATION

J. B. FORD DIVISION • WYANDOTTE, MICHIGAN

• *Wyandotte Chemicals Corporation consolidates the resources and facilities of Michigan Alkali Company and The J. B. Ford Company to better serve the nation's war and post-war needs.*

26 LETTERS...500,000 WORDS

Consider our alphabet—26 rather odd-looking symbols—or the marvelous "building-blocks" from which the rich half-million word vocabulary of our language has been built. It all depends on how you look at it.

Toledo Scale Research, too, started with "building-blocks" fully as prosaic as the alphabet itself. Man has known the basic principles of weighing for thousands of years. But it was the application of the Research Method that has made possible the truly amazing advances in weight-control and force-measuring. Located as they usually are, deep in the vital centers of industry, these Toledo devices are seldom seen by the general public. Yet, they control the quality and quantity of almost every kind of product... not only the familiar peace-time items... but the planes, tanks, engines, and munitions so vital to Victory!

Today, the results of Toledo Research appear in new and faster ways to weigh and classify bullets, measure airplane stresses under flight conditions, balance and standardize propellers, test engine horsepower, automatically control chemical batching... count, balance, record weight-facts... and in dozens of other essential control operations unthought of even a few years ago. These developments...and the ones still in the laboratory... are important to you, and to industry everywhere. For they mean that you can confidently look to Toledo for the greatest fund of practical "know-how" for the solution of your weight-control problems today...and in the days after Victory is won.

RESEARCH: *This man, at the control-panel, is weighing 9 different ingredients going into 3 furnaces of an alloy steel plant ... an operation made rapid, accurate and completely automatic by Toledo Scale Electric Weight-Control ... another product of Toledo Research.*

TOLEDO SCALE COMPANY

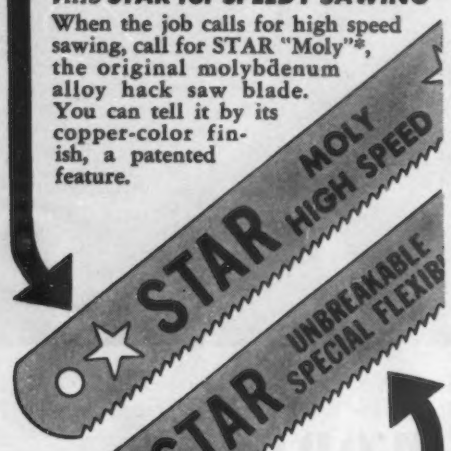
Toledo, Ohio

Canadian Toledo Scale Co., Limited, Toronto, Ont.

2 STARS YOU CAN STEER BY

In selecting hack saw blades, you can safely "steer by the stars", making sure you see the STAR trade mark which appears on the genuine Clemson-made product.

This STAR for SPEEDY SAWING
When the job calls for high speed sawing, call for STAR "Moly"*, the original molybdenum alloy hack saw blade. You can tell it by its copper-color finish, a patented feature.



This STAR for DIFFICULT SAWING
With a STAR Unbreakable Special Flexible, you get a standard alloy blade that cuts like an all-hard, eliminating breakage in use and resisting stripping of teeth. You can tell it by its patented green finish.

CLEMSON BROS.
INCORPORATED
MIDDLETOWN • NEW YORK

*T. M. Reg. – Blades bearing the name "Moly" are made only by Clemson Bros., Inc. and affiliated companies

Makers of STAR Hack Saw Blades, Frames, Band Saws, and Clemson D-17 Lawn Machines

4024

WPB Eases Frozen Schedule Adherence

Washington

• • • **Manufacturers** have been relieved from reporting to the War Production Board when adherence to a frozen production schedule prevents filling of orders rated higher than any frozen into their schedules.

Before issuance of Priorities Regulation 18, as amended June 23, manufacturers were required to report to the appropriate WPB industry division whenever such an instance occurred.

For example, assume that a frozen schedule which a manufacturer receives from WPB includes a purchase order bearing an AA-5 preference rating. The manufacturer has on his books a purchase order rated AA-4, which is not included in the frozen schedule. If he adheres to the frozen schedule, he will lack either materials or facilities to meet delivery dates specified in the AA-4 order. As a result of the amendment to Priorities Regulation No. 18, the burden of getting an uprating or an amendment to the frozen schedule, in favor of the AA-4 order, is thrown on the customer or the Claimant Agency involved.

The amendment also makes certain minor technical changes in the definition of the term "frozen schedules."

•

Chain Simplified

Washington

• • • **WPB recently** issued Order L-302, establishing simplified practices in the manufacture of welded and weldless chain and on allocation of production to promote the flow of certain quantities of chain into the hands of distributers and retailers for sale to farmers and other important users.

•

Oil Country Depots to Encourage Wildcat Drilling

Washington

• • • **Location of 12 oil-country** tubular goods depots to be established to meet emergency needs of wildcat operators was announced recently by Deputy Petroleum Administrator for War Ralph K. Davies. The depots are expected to be in operation some time in August. Towns in or near which the depots will be located and the quantity of tubular goods to be kept on hand are: Chase, Kan., 800 tons; Mt. Pleasant, Mich., 400 tons; Grayville, Ill., 500; Seminole, Okla., 500; Houston, Tex., 1300; Corpus Christi, Tex., 800; Odessa, Tex., 700; Shreveport, La., 700; Wichita Falls, Tex., 600; Cut Bank, Mont., 400; Casper, Wyo., 600; and Los Angeles, Cal., 2700 tons.

Object of the depot is to encourage wildcat drilling operations by meeting the need for minimum stocks of materials that will be available immediately when required for wildcat and emergency purposes. The Administrator estimated that at least 4500 wildcat wells should be drilled this year.

•

Restrictions Lifted On Aircraft Tubing

Washington

• • • **Restrictions on the** acceptance of deliveries of alloy steel airframe and engine tubing were eased recently by WPB so that manufacturers of such products can make the fullest use of their facilities. The Aircraft Scheduling Unit allocates this tubing to the aircraft manufacturers.

By this action, Direction No. 10 to CMP Regulation 2, aircraft manufacturers, if their current inventories are below a 60-day supply, may accept delivery of a quantity of any item of steel airframe or engine tubing not to exceed 5000 lb. or 10,000 ft. or a minimum mill production run, whichever is smallest.

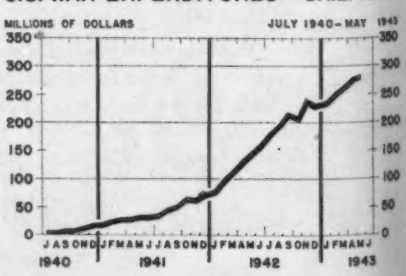
•

New Priorities System for Canada Issued; It's PCS

Ottawa

• • • **A new priority procedure** has been introduced in Canada, the Program Classification System, Department of Munitions and Supply, announced. Under an order by Priorities Officer W. E. Uren, industrial purchasers of goods or commodities valued at $25 or more must classify their purchases orders within one or more 24 Canadian code numbers. The new regulations apply only to pur-

U.S. WAR EXPENDITURES DAILY RATE



№ 170 TYPE DEOXIDINE

For GREATER EFFICIENCY

in Preparing Steel and Aluminum Ordnance Parts For Varnish and Paint Finishes...

DEOXIDINE #170, admirably suited to the processing of steel shell cases, is but one of a number of grades of ACP acid cleaners. The immersion process in which it is used is adaptable to the cleaning of many other ordnance or marine parts. Other grades of DEOXIDINE are available for brush or spray processes where these are indicated for expediting production.

DEOXIDINE #170 is a chemical that removes light oil, annealing scale and eradicates rust and rusters, producing a clean, minutely-etched, paint-receptive surface. The rusters, even though invisible, are destroyed, eliminating the possibility of defects developing beneath the protective finish. DEOXIDINE does not produce a coating on the cleaned surface which on shell cases, for example, might crack in crimping and in obturation and ruin the protection of the final finish.

DEOXIDINE meets U.S. Ordnance Department requirements for its efficiency in removing rust and neutralizing rust producers before protective finishes are applied.

CHEMICALS ACP PROCESSES

Manufacturers of Inhibitors & Metal Working Chemicals

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

Send today for Deoxidine #170 Pamphlet showing how simple it is to use.

*Name*_____

*Position*_____

*Firm Name*_____

*Address*_____

E-7

"YANKEE" TOOLS
GET THINGS DONE!

Speed is their middle name. Like an arrow in flight, they go true to the mark in straight-line production. Spiral Screw Drivers. Automatic Drills. Ratchet Bit Braces. Tap Wrenches. Quick-detachable Vises with swivel bases. These and other "Yankee" Fine Mechanics' Tools get things done . . . with speed and precision.

Speed is inherent in the very *design* of "Yankee" Tools, which for almost a half century have contributed to the efficiency and reputation of American production . . . a priceless asset in a war where *time* is the greatest shortage of all. Be sure to provide priority ratings whenever possible.

Order from your supply house or write to us . . . c/o Dept. IA-7. Every effort will be made to meet your requirements.

"YANKEE" SPIRALS
SIMPLE • COMPACT • STRONG
A SIZE FOR EVERY PURPOSE

"YANKEE" TOOLS
make good mechanics better
North Bros. Mfg. Co., Phila., U. S. A.
Established 1880

chase orders placed in Canada and do not affect retailers or those who buy from retailers. Industrial and mill suppliers, warehouses and other business performing similar functions for industry, are not deemed to be retailers for the purpose of the new procedure. Detailed information will be made available through the regional priorities offices at Halifax, Montreal, Toronto, Hamilton, Windsor, Winnipeg, Edmonton and Vancouver.

•

Two new orders issued by the War-time Prices and Trade Board eliminate production of some 500 sizes of iron, cast and forged steel, brass, bronze valves, and cover gate, globe, angle, cross, lift check, angle check and swing check valves and variations thereof made from the above metals.

•

Brass Mill Warehouses To Report on Form WPB-3009

• • • **Wire mill warehouses** are required to report shipments from their inventories, under operation of CMP after July 1. On Form WPB-3009, which displaces Form PD-123D. Each copper wire mill warehouse, an announcement stated, is to file its first report on this new form on or before July 5, and monthly thereafter.

The use of Form WPB-3009 does not affect the recent directive providing for report on or before July 10, on Form PD-123, covering shipments made against orders bearing preference ratings only of AA-5 or higher from May 21 to June 30, inclusive. That will be the final report made on PD-123.

•

Licenses Required of Canadian Tool Dealers

Ottawa

• • • **On and after** July 1, all dealers in Canada in new or used machine tools must operate under license from Thomas Arnold, machine tool controller. Application for licenses should be made to the controller at 1020 Dominion Square Building, Montreal. Under the terms of the new order, the only free movement of machine tools after July 1 will be from a licensed dealer to a consumer. Except under permit from the controller, there shall be no movement of machine tools between dealers, or between consumers, or from a consumer to a dealer. The order covers only power operated metal working machine tools.

Amended List Issued Of B Product Symbols

• • • **A series of revisions** have been issued to the list of official program identification symbols for WPB Industry Divisions Class B products, originally published in full on page 112 of the April 22 issue of THE IRON AGE. The revisions as outlined by WPB are as follows:

Automotive Division

Add B-4 256 Aircraft ground servicing equipment: Automotive maintenance type.

Radio and Radar Division

Add J-9 255 Vacuum tube manufacturing, processing and testing machinery.

General Industrial Equipment Division

Eliminate J-5 156 Bearings, lineshaft, etc.
Eliminate J-5 709 Chains, industrial power transmission.

Textiles, Clothing and Leather Division

Eliminate S-4 091 Rope, aircraft.

Steel Division

Correct S-4 715 to read "Nails, iron or steel, cut."

Mining Division

Correct J-7 315 to read "Drills, mining: Electric, core."

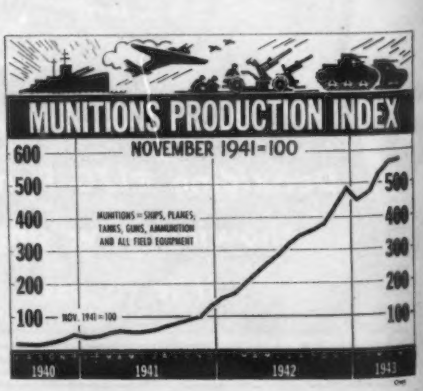
•

Use of MRO Order Not Permitted for Gas Cylinders

Washington

• • • **To correct** misunderstandings by users, WPB has issued Interpretation No. 1 of General Preference Order M-233, which points out that a preference rating for maintenance, repair and operating supplies may not be used to obtain gas cylinders from manufacturers. This applies whether the user carries his gas cylinders as operating supplies or as capital equipment.

A user desiring to purchase gas cylinders is required to obtain a preference rating assigned specifically for this purpose on WPB Forms 541 or 542 (formerly forms PD-1A or PD-3A). These forms should be filed with the Containers Division, WPB, Washington, D. C. Ref: M-233.



THERE IS ONLY *SO MUCH* TOOL STEEL AVAILABLE!

No. 3 in a series of 2⅓ by 3½ foot posters in color, designed to help reduce tool breakage through worker education, made available to users of **"TOMAHAWK"** tools, without charge.

For complete information wire or write

GENESEE TOOL COMPANY
FENTON, MICHIGAN

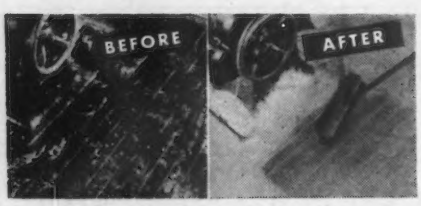
® Registered Trade Mark

FLOORS OIL-SOAKED?
Nothing can touch
SPEEDI-DRI
for
EFFECTIVENESS
ECONOMY
SAFETY

Those oil-soaked floors around the irreplaceable machinery in your plant are a fire hazard, an accident hazard, a production hazard and an employee morale hazard. You can control *every one* of these hazards as easy as rolling off a log. Just dig a scoop into a bag of SPEEDI-DRI and sprinkle this oil-thirsty, granular material on the floors.

SPEEDI-DRI will soak up the oil and grease quickly, provide a non-skid surface, protect workers' shoes and feet, remove the cause of slipping accidents, minimize the danger of fires and improve morale by giving employees a clean, safe place to work.

SPEEDI-DRI is quickly spread by hand and easily cleaned up without a minute's interruption of production. It eliminates the need for expensive scouring and saves vital manpower. No matter what method you may now be using to keep your floors free from grease and oil, SPEEDI-DRI can do the job better, faster, cheaper. Ask us for a FREE SAMPLE of SPEEDI-DRI and test it in your own plant. (Where water is present or water-soluble oils are used, ask for SOL-SPEEDI-DRI.)



Dangerous, slippery, oily floor. Same floor, after using Speedi-Dri.

SPEEDI-DRI
OIL AND GREASE ABSORBENT

SUPPLIERS
East — REFINERS LUBRICATING CO.
New York 1, N. Y.
Midwest and South
WAVERLY PETROLEUM PRODUCTS CO.
Philadelphia 6, Pa.
West Coast
WAVERLY PETROLEUM PRODUCTS CO.
Menlo Park, Calif.

DPC Approves Contract For G-E Plant Equipment

Washington

• • • **Defense Plant Corp., RFC subsidiary, has authorized the following contracts:**

General Electric Co., Schenectady, N. Y., to provide equipment for a plant in Pennsylvania at a cost in excess of $825,000.

Jacobs Aircraft Engine Co., Pottstown, Pa., to provide additional facilities for a plant in Pennsylvania at a cost in excess of $625,000, making a total commitment of more than $22,000,000.

Goodyear Aircraft Corp., Akron, Ohio, to provide additional facilities at a plant in Arizona at a cost in excess of $450,000, making a total commitment of more than $6,400,000.

American Export Airlines, Inc., New York, to provide additional facilities in New York at a cost in excess of $35,000, making a total commitment of more than $1,100,000.

Eastman Kodak Co., Rochester, N. Y., to provide additional equipment for a plant in New York at a cost in excess of $40,000, making a total commitment of more than $425,000.

National Screw & Mfg. Co., Cleveland, to provide machinery and equipment for a plant in Ohio at a cost in excess of $175,000.

Fulton Iron Works, St. Louis, to provide equipment for a plant in Missouri at a cost in excess of $100,000.

A. J. Miller Co., Bellefontaine, Ohio, to provide equipment and machinery at a plant in Ohio at a cost in excess of $25,000.

General Motors Corp., Detroit, to provide additional facilities at plants in Ohio at a cost in excess of $11,300,000, making a total commitment of more than $24,500,000.

Columbia Steel Castings Co., Portland, Ore., to provide additional facilities for a plant in Oregon at a cost in excess of $135,000, making a total commitment of more than $1,000,000.

B. F. Goodrich Co., Akron, Ohio, to provide machinery and equipment at a plant in Ohio at a cost in excess of $900,000.

Plantation Co., Inc., Vienna, Ga., to provide plant facilities in Georgia at a cost in excess of $120,000.

Ford Motor Co., Detroit, to provide additional equipment at a plant in Michigan at a cost in excess of $500,000, making a total commitment of more than $83,000,000.

Curtiss-Wright Corp., Buffalo, to provide additional facilities at a plant in Ohio at a cost in excess of $100,000, making a total commitment of more than $28,000,000.

J. S. Abercrombie Co. and Harrison Oil Co., Houston, Tex., to provide additional facilities at a plant in Texas at a cost in excess of $1,100,000, making a total commitment of more than $15,500,000.

United Aircraft Corp., East Hartford, Conn., to provide additional plant facilities at a plant in Connecticut at a cost in excess of $770,000, making a total commitment of more than $3,100,000.

The American Distilling Co., Inc., New York, to provide additional equipment for a plant in Illinois at a cost in excess of $75,000, making a total commitment of more than $825,000.

Stuart Oxygen Co., San Francisco, to provide additional facilities at a plant in California at a cost in excess of $80,000, making a total commitment of more than $335,000.

Washington County Flax Growers, Hillsboro, Ore., to provide plant facilities in Oregon at a cost in excess of $180,000.

Approved Flax Co., Passaic, N. J., to provide plant facilities in Oregon at a cost in excess of $80,000.

United Shoe Machinery Corp., Boston, to provide equipment at a plant in Massachusetts at a cost in excess of $60,000.

Schnitzer Steel Products Co., Portland, Ore., to provide facilities at a plant in Oregon at a cost in excess of $50,000.

Ballofet Dies & Nozzle Co., Guttenberg, N. J., to provide additional equipment for a plant in New Jersey.

Cochaud Wire Die Corp., New York, to provide additional equipment for a plant in New York.

Fort Wayne Wire Die Co., Inc., Fort Wayne, Ind., to provide additional equipment at a plant in Indiana.

Award of a contract to Weymouth Construction Co., Memphis, Tenn., for construction of concrete runway and taxiway, grading, drainage and accessory work at an Army Air Forces installation in Caddo Parish, La., to cost in excess of $1,000,000. The work is to be supervised by the Little Rock district office of the Corps of Engineers.

Authorization for construction of aprons and runways at an Army Air Forces installation in Rapides Parish, La., to cost approximately $1,000,000. Work incident to the project will be supervised by the Little Rock district office of the Corps of Engineers.

Award of a contract to Charles M. Dunning Construction Co., Oklahoma City, for construction at an Army Air Forces installation in Oklahoma County, Okla., to cost in excess of $2,000,000. The work is to be supervised by the Tulsa district office of the Corps of Engineers.

Award of a contract to Corbetta Construction Co., Inc., New York, for construction at an Army Air Forces installation in Tulsa County, Okla., to cost in excess of $2,000,000. The work is to be supervised by the Tulsa district office of the Corps of Engineers.

Authorization for construction of runways, taxiways, and parking aprons at an Army Air Forces installation in Chaves County, N. M., to cost approximately $1,000,000. Work incident to the project will be supervised by the Albuquerque, N. M., district office of the Corps of Engineers.

•

New Construction Contracts Amount to Over $8 Million

• • • **The War Department announced June 30:**

Award of a contract to MacDougald Construction Co., Atlanta, Ga., for construction at an Army Air Forces installation in Orangeburg County, S. C., to cost in excess of one million dollars. This work is to be supervised by the Charleston, S. C. district office of the Corps of Engineers.

Award of a contract to Morrison-Knudson Co., Inc. and Ford J. Twaits Co., Los Angeles, Cal., for construction at an Army Air Forces installation in Jefferson County, Ore. to cost in excess of one million dollars. This work is to be supervised by the Portland, Oregon district office of the Corps of Engineers.

Award of a contract to S. J. Groves & Sons Co. and Johnson, Drake & Piper, Inc., Ridgefield, N. J. and New York, for construction at an Army Air Forces installation in Essex County, N. J. to cost in excess of three million dollars. This work is to be supervised by the New York, N. Y. district office of the Corps of Engineers.

Award of a contract to San Ore-Miller Clarkson, Garden City, Kan., for construction at an Army Air Forces installation in Sedgwick County, Kan., to cost in excess of one million dollars. This work is to be supervised by the Kansas City, Mo., district office of the Corps of Engineers.

Award of a contract to Thomas Bate & Sons, Denver, Colo., for construction at an Army Air Forces installation in Denver County, Colorado, to cost in excess of one million dollars. This work is to be supervised by the Denver, Colorado district office of the Corps of Engineers.

Authorization for construction of additional facilities at an Army Air Forces installation in Chaves County, N. M., to cost in excess of one million dollars. Work incident to this project is to be supervised by the Albuquerque, N. M., district office of the Corps of Engineers.

IS THERE One Part SO "SCREWY" YOU DON'T KNOW WHERE TO GET IT?

NEARLY every complex mechanism has at least one "screwy" part... one that requires deeper study; special operations for which standard equipment is not adaptable; unusual control of precision operations or metallurgical processes.... Does a difficult part of that sort now stymie your production or purchasing schedules? Is the puzzle of not knowing where to buy that part preventing your progress on present war production or future planning?

Contact KAYDON

By reason of highly specialized facilities plus broad production and engineering experience in metallurgy, special hardening, precision metal working and plastics, Kaydon is able to get around obstacles and roll straight to the production goals required by the schedules.

In unvarying precision, uniform quality, and "on-time" deliveries you can rely on Kaydon... now, for war production service; later for post-war products.

CAPACITY Immediately AVAILABLE for ball and roller BEARINGS Size 6" to 60"

For excellence in production of extremely precise, unusually large ball and roller bearings.

THE KAYDON ENGINEERING CORP.

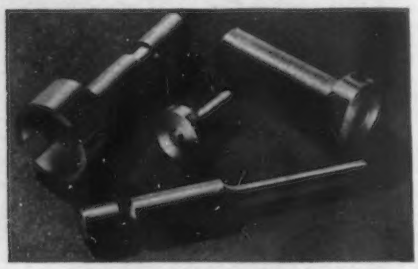
McCRACKEN STREET • MUSKEGON, MICH.

Specialists in Difficult Manufacturing

PRECISION PARTS

THEIR END-USE IS A SECRET

A story of amazing accuracy of American instruments will come out of this war. It can't be told yet because there are still a lot of surprises in store for Herr Hitler and his gang of bandits. There is no secret, though, back of the amazing precision work that has made this accuracy possible.



"... ten times as fast ..."

These small, army, instrument parts are typical. Each is centerless ground to within tolerances of .0002". Concentricity between diameters is held to limits of ten thousandths. Some of them call for definite radius requirements where the shank meets the head. Others must have no radius at all. And there is another very important requirement—they must be turned out by the thousands.

Ace is a pioneer in this ever-increasing accuracy which World War II has taught to mass production. Management "know-how" and modern equipment are turning out tolerances as close as .0001", and finishes which a speck of dust or a warm hand distorts—and doing it ten times as fast as ever before. Ace is a dependable source for volume production of Bar Stock, Shafts, Studs, Pins, Punches, Taper Pins and parts. Diameters may be as small as .020" or as large as 6". Capacity is available for your Centerless Grinding requirements. If you have any grinding problems send us a sample, sketch, or blueprint for quotation.

This new booklet describes the facilities available at Ace for the machining, assembling and heat treating of small parts. A copy will be gladly sent upon request.

ACE MANUFACTURING CORPORATION

for Precision Parts

1203 E. ERIE AVE., PHILADELPHIA 24, PA.

Briefly Told—

WMC Reveals Over Third Of Newly Employed Are 45 Years of Age or Over

• **More than a third** of the total number of persons employed in May were 45 years of age or older, Paul V. McNutt, chairman of the WMC, said recently.

•

• According to the U. S. Civil Service Commission, there is a particular need now for persons who have had executive experience in business or industry to do work in connection with the extension of the rationing program in various commodity fields. -Persons are desired who have had executive experience (involving analysis) in business or industry as distributors or manufacturers of such commodities as metals, consumer goods or industrial equipment. Specialization may have been in sales management, factory management, procurement, market analysis, traffic management, or expediting of production. The positions pay from $2,433 to $7,128, but few appointments will be made to positions paying $5,228 and over. There are no age limits.

•

• *C. E. Wilson, president of General Motors, declared July 2 that his company is the prime contractor in a network of more than 68,000 supply lines extending from GM manufacturing divisions to the plants of other manufacturers in all parts of the country. Almost 19,000 different subcontractors and suppliers are working with General Motors on its war job, he said. Each of the 37 manufacturing divisions and other operating units of General Motors purchased from an average of 1852 sources during 1942.*

•

The cost of metals will go down sharply after the war, according to B. W. Clark, vice-president in charge of sales for Westinghouse Electric & Mfg. Co. He based his forecast on the vast expansion in light metals and on wartime research in alloys.

•

• Cessna Aircraft Co., Wichita, Kan., which is planning to manufacture a low-priced family plane after the war, attributes a large part of its high employee morale and low absenteeism rate to announcement of this project and the resulting feeling of employee security. At present, the company is on 100 per cent production of bomber pilot training planes and transports.

•

• An anti-aircraft gun that can fire projectiles 60,000 ft. into the stratosphere is now being manufactured in huge quantities, Maj. Gen. G. M. Barnes, chief of the technical division, Ordnance Corps, told an assembly of scientists at the closing ceremonies of the dedication of the new research laboratory of the Goodyear Tire & Rubber Co.

•

• Expenditures for new industrial plants and expansion of previously existing facilities in the Chicago area during the first half of 1943 have totaled $83,889,937, according to the Chicago Association of Commerce. This brings the investment in new factories and equipment since the beginning of the war production program in 1940 to a mass figure of $902,544,937.

•

• Manufacturers were warned to file applications for patents as soon as practicable, especially in these times of extended development and research work, in a talk before the Milwaukee Patent Law Association by Col. Francis W. Parker, Jr., executive officer of the Chicago ordnance district. In explanation he reported, "In 1926 there were $800,000,000 worth of patent claims pending against the government, most of them brought by third party alleged inventors who had no contract with the government. Unless steps are taken to head off third party claims, the claims against the government will be infinitely greater."

•

• Officials of the Dow Chemical Co. announced recently that full scale production had been achieved six weeks ahead of schedule in the first unit of its new styrene plant located in Los Angeles. Styrene is an essential ingredient of Buna S synthetic rubber and this plant is part of three manufacturing units of the Synthetic Rubber Project.

•

• *American manufacturers are using less steel to produce a greater number of artillery shells under improved methods of manufacture developed by the Pullman-Standard Car Mfg. Co., Wallace N. Barker, vice-president, revealed recently. The improved process, made available to the industry, has saved 28,000 tons of steel in the Pullman-Standard shell plants alone up to the end of 1942, which was enough to produce 526,400 additional shells.*

•

• Mechanical and electrical engineers, production specialists, naval architects, draftsman, inspectors of mechanical and electrical equipment, expediters and men with highly technical backgrounds are needed by the newly-established Cincinnati section of the Army Transportation Corps, it is announced by Colonel Harry A. Toulmin, Jr., assistant chief of transportation for supply

•

• To see to it that every government-owned war plant in the Cleveland area is converted to business ownership after the war is one of the three major objectives of the Cleveland local committee of the Committee for Economic Development's field development division, Elmer L. Lindseth, chairman of the committee, told the central regional conference of the National Industrial Advertisers Association at a recent meeting.

•

• Ordnance citations for outstanding conservation of critical materials through redesign were presented on June 30 to 14 firms in the Cleveland Ordnance district, bringing to 19 the number of firms in the district so honored. This represents one-fourth of the country's total citations. The companies honored were: Murray Ohio Mfg. Co., Reid Products Corp., Midwest Forge Co., Cleveland Welding Co. and Morrison Products Co., all of Cleveland; Spun Steel Corp., Canton, Ohio; Great Lakes Stamping Co., Toledo Stamping & Mfg. Co., and Prestole Devices, Inc., all of Toledo; Girard Mfg. Co., Girard, Pa.; Lovell Mfg. Co., Erie, Pa.; and Inland Mfg. division, General Motors Corp., Dayton, Ohio.

•

• An elaborate compilation of warehouse price quotations in New York, New Jersey and Lower Connecticut has been published by Faitoute Iron & Steel Co., Inc., Newark, N. J., reflecting recent changes in Price Schedule 49. This replaces the mimeographed schedule which the company issued a few months ago.

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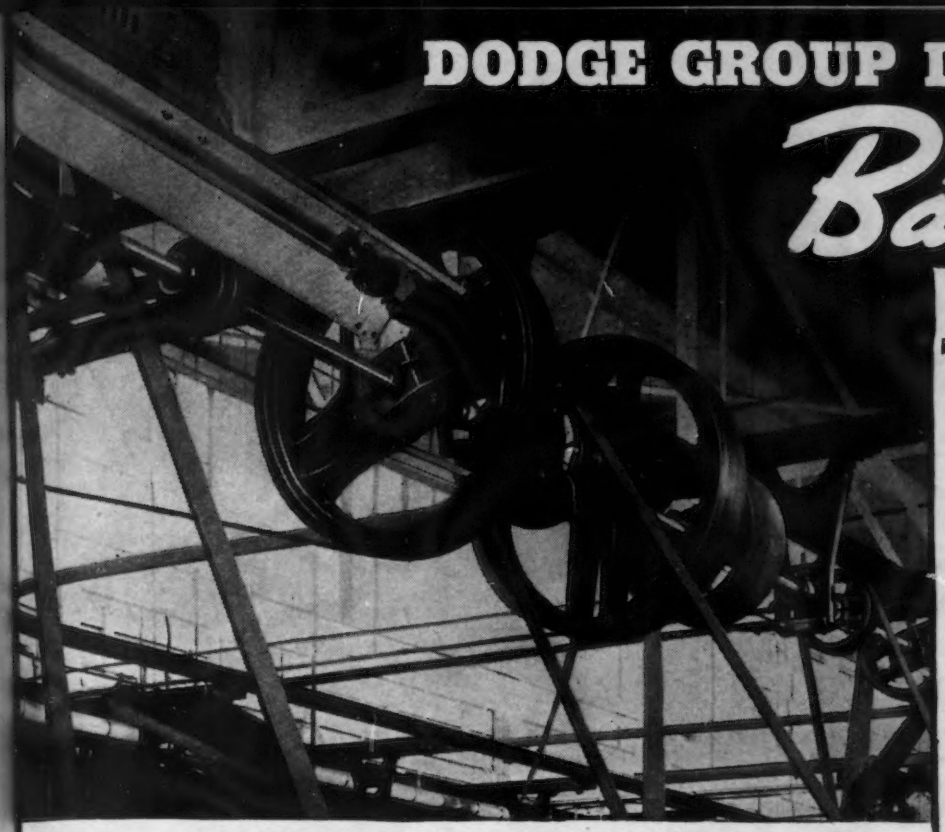
• The scarcity of corn for core binders is causing Milwaukee foundries some concern. Several large corn refiners are threatened with shutdowns if the situation is not relieved soon.

DODGE GROUP DRIVES BOOST *Battle Power*



"SHARE-THE-RIDE" Principle in POWER TRANSMISSION

Modern Dodge Group Drive applies share-the-ride principles to horsepower delivery. Taken from its source, capacity power, over short power "roadbeds," is delivered enroute to a group of production machines. Group drive permits one motor to do the work of several (a *powerful* advantage in these war days when conservation of materials and manpower is so vital).

Dodge Group Drive puts all the power in the job . . . boosts battle power, hastens Victory! By reducing connected horsepower, conservation is assured in motors, wiring, controls and other critical equipment and materials. Initial cost is low . . . fixed charges and maintenance costs are reduced. Cost of horsepower-delivery drops.

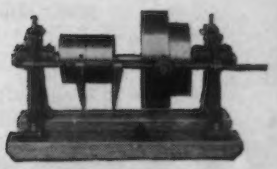
In the complete Dodge line are all the component parts for group drive . . . shaftings, hangers, pulleys, bearings, clutches . . . as well as individual motor drives, including D-V Matched Quality V-Belt Drives.

Contact nearest Dodge Distributor or write

DODGE MANUFACTURING CORPORATION, Mishawaka, Indiana, U.S.A.

DODGE SHAFT HANGERS

Shown here is the Dodge 4-point Pressed Steel Drop Hanger which may also be used as a Post or Bracket Hanger. 2-point and 4-point Iron Hangers also available.



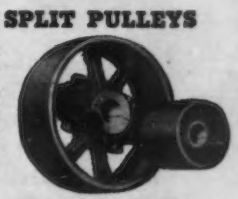
DODGE COUNTERSHAFTS

Can be supplied to meet any specifications with the proper type of hangers, bearings, pulleys and clutches to meet any requirement.

DODGE-TIMKEN Hanger Bearings

A completely assembled, factory adjusted, pre-lubricated unit delivered ready to install. Effectively sealed against admission of dirt or loss of lubricant.

DODGE STEEL SPLIT PULLEYS



Strong, rugged, light in weight. Easy to erect. Grooveless oval crown permits low belt tension—saves power. Also wood and iron pulleys for every service.

DODGE FRICTION CLUTCHES

The Dodge Solid Friction Clutch shown here is particularly adapted for modern group drives and general power transmission service. Other types and sizes up to 1000 HP. at 100 R.P.M.

DODGE-TIMKEN PILLOW BLOCKS

For power transmission or machinery applications. Completely assembled, factory adjusted, pre-lubricated; seals exclude dust and dirt and retain lubricant. Easy to install. Long life (30,000 hours of service under conditions for which they are adapted) . . . (good for 50 million revolutions without re-lubrication, under normal conditions).

DODGE VICTORY WOOD SPLIT PULLEYS

Great tractive pull . . . long belt life . . . power saving. Balanced. Interchangeable bushings (for various sizes of shafts). Compression fastening to shaft. Easy to install. Light weight. They conserve metal!

Dodge VICTORY Wood Split Pulleys on a double reduction drive.

DODGE

MISHAWAKA

THROW ALL YOUR SCRAP INTO THE FIGHT! BUY MORE WAR BONDS!

THE RIGHT DRIVE FOR EVERY JOB

PUT *ALL* YOUR POWER IN THE JOB

PERSONALS

• **J. Guy Griffith,** president of the J. Guy Griffith Co., Pittsburgh, has been appointed western Pennsylvania representative of the Wapakoneta Machine Co., Wapakoneta, Ohio, succeeding the late J. E. Fawell. Mr. Griffith was formerly assistant plant engineer of the New Kensington Plant of the United States Aluminum Co. and continued in that capacity until 1925 when he organized his own company and engaged in a specialized engineering service and equipment sales, serving the steel, coal, and aluminum industries.

• **Ernest Muller** has been made assistant to Mark A. Follansbee, vice-president in charge of sales, Follansbee Steel Corp., Pittsburgh. Mr. Muller was for several years engaged in sales with American Steel & Wire Co. and later in research for U. S. Steel Corp. of Delaware. In his new post, Mr. Muller will devote a major part of his efforts to the company's post-war objectives.

• **Julian M. Avery** has been elected vice-president in charge of research and development of Diamond Alkali Co., Pittsburgh. Mr. Avery has been director of the research and development laboratory at Diamond's main plant in Painesville, Ohio, since coming with the concern in 1941 from Arthur D. Little, Inc., consulting chemical and engineering firm, Cambridge, Mass. Previously he spent a number of years with Union Carbide & Carbon Corp. doing work in both the U. S. and Europe in the development and commercialization of new products and processes.

J. GUY GRIFFITH, president of the J. Guy Griffith Co., Pittsburgh, and western Pennsylvania representative for the Wapakoneta Machine Co.

• **C. B. Cook** has been appointed vice-president in charge of advertising, sales promotion and export sales, Elwell-Parker Electric Co., Cleveland. Mr. Cook joined the company in 1914. He organized the sales-promotion department, and laid the foundation for Elwell-Parker's export activities. He has been a director of the company since 1941. Mr. Cook is a member of the Cleveland Chamber of Commerce and a director of the National Industrial Advertisers Association.

• **James G. Gammel** has been promoted to the position of technical assistant in brush engineering service at Osborn Mfg. Co., Cleveland. Since joining Osborn, Mr. Gammel has been particularly active in helping war industries increase production through the application of industrial brushing techniques and methods. He will act as assistant to G. O. Rowland, Osborn executive, who is chief of WPB's industrial brush unit.

• **Herbert Tutwiler,** a director of the Black Creek Coal & Coke Co., Birmingham, Ala., has been named district chief of the Birmingham Ordnance District which is comprised of the states of Alabama, Mississippi, Georgia, Louisiana, and Florida. His offices as district chief will be in the Frank Nelson Building, Birmingham, Ala.

• **G. C. Hoyt** has been elected vice-president in charge of foreign sales, International Harvester Co., Chicago. Mr. Hoyt succeeds **E. A. Brittenham** who is retiring after more than 41 years of service with the company. Mr. Hoyt joined International Harvester in 1916 as a salesman for its San Francisco branch house. In 1935 he was promoted to district manager in charge of the African-Indian sales district. He became director of foreign sales in 1940.

• **J. W. Hennen** has been made manager of the Nashville division of Consolidated Vultee Aircraft Corp. Mr. Hennen entered the aircraft industry in 1928 as production chief for Boeing Aircraft Co., Seattle. He had charge of the manufacture of the B-17 Flying Fortress until he joined Consolidated in 1939 as production manager at the Vultee Field Division, California. He was formerly assistant manager of the New Orleans division.

• **Norman B. Schreiber** resigned as president of the Andrews Steel Co., Newport, Ky., recently. He was elected chairman of the board of Hardy-Burlington Mining Co., Hazard, Ky. **Charles H. Stamm,** former vice-president, was elected president of the Andrews Steel Co. **Jerome S. Greenberg** resigned his position as vice-president of the Andrews Co. to return to his law practice in Chicago.

JULIAN M. AVERY, vice-president in charge of research and development, Diamond Alkali Co., Pittsburgh.

C. B. COOK, vice-president in charge of advertising, sales promotion and export sales, Elwell-Parker Electric Co., Cleveland.

Herbert W. Boal was appointed vice-president and treasurer in Mr. Greenberg's place.

• **Frank L. Wright** has been appointed manager of research at Norma-Hoffman Bearings Corp., Stamford, Conn. Mr. Wright has been with the company eleven years, and was formerly chief metallurgist. Warren D. Anderson has been made chief engineer for the company. He has been a member of the engineering staff for over five years.

• **George M. Muschamp** has been appointed vice-president in charge of engineering of the Brown Instrument Co., Philadelphia, a subsidiary of Minneapolis-Honeywell Regulator Co. He has been with the Brown engineering department for 12 years, and has been in charge of engineering for the past three years. He directed the development of the electronic potentiometer for controlling industrial temperatures, and the flight recorder which is used in testing war planes. **Paul L. Goldstrohm** has been appointed vice-president in charge of production. He was formerly the company's purchasing agent, and for the past two years has been assistant general manager. He has been with the company 20 years.

• **Roy Stephens** has been made vice-president of International Business Machines Corp., New York. Mr. Stephens joined the company in 1913 and has held the positions of district manager, sales manager, director of sales promotion, and executive assistant. **L. H. LaMotte** was also appointed a vice-president of the company. He joined the company in 1922, and since 1937 has been manager of the Washington office in full charge of all business with the government. **Garland B. Briggs**, former manager of the Norfolk, Va., office, was elected assistant treasurer. **John E. Zollinger**, previously manager of the Cleveland office, was appointed eastern sales manager. **Clarence W. Christman**, former manager of the Akron, Ohio, office, was appointed manager of the department of applications, New York.

• **David MacGregor** has been appointed chief engineer of the Edward Valve & Mfg. Co., Inc., East Chicago, Ind. He has been associated with the company in various engineering capacities since 1925.

• **Martel H. Brett** has been named acting assistant to Ernest D. LeMay, director of public relations of the Tennessee Coal, Iron & Railroad Co. Mr. Brett fills the post left vacant by **Randolph Fort**, who recently joined the field staff of the American Red Cross. Mr. Brett was formerly a member of the editorial staff of the *Birmingham Age-Herald*.

• **Dean Harvey**, materials engineer, Westinghouse Electric & Mfg. Co., was elected president of the American Society for Testing Materials at the recent annual meeting in Pittsburgh. **John R. Townsend**, material standards engineer for the Bell Telephone Laboratories, Inc., New York City, was elected vice-president.

• **Frank E. Bates**, Buffalo, has been elected chairman of the Western New York chapter, American Foundrymen's Association, succeeding Ralph T. Rycroft.

• **Samuel A. Huffman** has been appointed plant manager of Kobe Inc., Huntington Park, Cal. He will be in complete charge of hydraulic manufacturing. Mr. Huffman was formerly plant manager for the Miller Printing Co., Pittsburgh, and the Arms Franklin Corp.

• **Lee B. Green** has been appointed executive vice-president and general manager, Designers For Industry, Inc., Cleveland. Mr. Green was formerly manager of Firestone Rubber & Metal Products Co., subsidiary of Firestone Tire & Rubber Co.

• **H. B. Hodgins** has been named manager of the Spokane office of the Westinghouse Electric & Mfg. Co. Mr. Hodgins joined Westinghouse in 1923. Early in 1935 he was appointed the company's representative at Coulee Dam, and has served in the Spokane area since that time. His offices are located at South 158 Monroe St.

•**H. A. Elwell** has been appointed general bridge inspector for Chicago Great Western Railway Co., Chicago. Mr. Elwell's headquarters will be at St. Paul.

• **N. H. Schwenk** has resigned as divisional vice-president of Cramp Brass & Iron Foundries Division, the Baldwin Locomotive Works, Philadelphia. Mr. Schwenk has been connected with the company in various capacities for more than 39 yrs. He started with the William Cramp & Sons Ship & Engine Bldg. Co.

• **Frederick I. Lackens**, advertising manager of the Hays Corp., Michigan City, Ind., was elected president of the National Industrial Advertisers Association, Inc., at their annual election of officers held at the Hotel Statler, Cleveland, June 25. Vice-presidents elected were: **Alan Ballantyne**, advertising manager Novo Engine Co., Lansing, Mich.; **Walter A. Bowe**, public relations manager, Carrier Corp., Syracuse, N. Y.; **Wilmer H. Cordes**, sales and promotion manager, American Steel & Wire Co., Cleveland; **Edward V. Creagh**, sales promotion manager, American Chain & Cable Co., Inc., Bridgeport, Conn.; **John A. M. Galilee**, assistant advertising manager, Canadian Westinghouse Co., Ltd., Hamilton, Ont.; **John H. Kunkel**, director of public relations, Fluor Corp., Los Angeles; **J. M. McKibben**, manager, promotion & training, Westinghouse Elec. & Mfg. Co., East Pittsburgh; **Graham Rohrer**, assistant to vice-president, Baldwin-Hill Co., Trenton, N. J.

OBITUARY...

• **William A. Tryon**, president of the Trayer Products, Inc., Elmira, New York, died recently.

• **William C. Baker**, founder of the Baker Foundry & Machine Co., Amesbury, Mass., died June 22. He had retired from business several years ago.

• **Carl King**, general superintendent of the Wickwire Spencer Steel Co., Palmer, Mass., plant, died suddenly June 25. He became associated with the company in 1920, prior to which he had an executive position with the American Steel & Wire Co., Worcester, Mass. He was 63 years of age.

• **William E. Sykes**, inventor of the Sykes process of gear generation and the Sykes continuous tooth herringbone gear, died at his home in Middlesex, England, recently. Mr. Sykes joined the Farrel-Birmingham Co., Inc., Buffalo, when that company acquired the American rights to his inventions in 1923. In 1937 Mr. Sykes returned to England to operate his own gear business, W. E. Sykes Ltd. He retained connection with Farrel-Birmingham Co. as consulting engineer.

• **George H. Kneisler**, controller for the Vilter Mfg. Co., Milwaukee, died suddenly at his home in Milwaukee recently. He had been with Vilter for 14 years. Mr. Kneisler was 66 years of age.

MACHINE TOOLS

. . . News and Market Activities

Tool Industry Looks to Post-War Activities

Cleveland

• • • **What is ahead** for the machine tool industry? Much has been written, and more has been said about the machine tool industry and the post-war period, but that period is still the big question mark to the builder. It is accepted that there will be a substantial foreign market succeeding the stoppage of hostilities and a limited domestic reconversion and replacement market, but both will have a limited time period. The bulk of machine tools built for the war program, like Banquo's ghost, will rise up and plague the builder. They will live for years to come and have been produced in such huge quantities that future machine tool booms are unlikely for many years.

At present, as machine tool contracts are curtailed, producers are taking on war contracts and subcontracts. This is all very well as long as the war contracts last, but afterward each and every builder will be faced with an immediate and urgent problem.

Every builder has a machine shop that can handle practically every type of machining operation known. The problem then arises as to how to utilize this capacity to its fullest extent and its greatest efficiency. Generally there are two methods of accomplishing this job. First, work that is large in scope and that requires a great many machines for completion can be sought. By careful selection, the jobs taken can be made to utilize the maximum amount of the producing capacity of the shop. On the other hand, many small jobs scattered through the shops, each in itself requiring only a very small part of the shop equipment for completion, can also be sought.

Each of these types of jobs has its advantages and disadvantages. The large jobs permit wider utilization of shop equipment, have a greater net return per unit, permit complete job setups that will require less direct supervision after running well, and are likely to be on longer range contracts. On the other hand, a bad estimate on production costs, a run of trouble on production equipment or wastage through bad machining is likely to be extremely costly. In addition, while large job contracts might require smaller sales forces, the selling would be much harder and the loss of a contract at any given time might be serious to the company.

The small job contract or subcontract would permit production line techniques to be established, require less all-around skilled help, and would likely be much easier to sell. However, profit would depend upon volume and a very extensive sales force might have to be maintained to keep all parts of the machine tool builder's shop in operation. Losses from spoiled material per unit would be considerably less than for large jobs, but could occur more frequently.

These ideas are not new, but are reflections of how builders are thinking today. Some have considered market consumer products under their own trade name, while others feel they would rather be a production shop producing for some other manufacturer.

•

Predicts Tool Output Decline to 50% of Capacity

Chicago

• • • **The machine tool industry** has passed its war time peak and new business will probably continue to decline until operations reach about 50 per cent of capacity, the Chicago Federal Reserve Bank predicts in a recent report on the machine tool industry. The sharpest decline will come by the end of 1943 or early 1944, the report says. However, it added, there is a possibility of a temporary boom in the reconversion period immediately after the war but the outlook for the future "is for the most part unfavorable."

The bank's report also pointed out that because of the still urgent need for war materials it was very unlikely that machine tool plant facilities will be permitted to stand idle. Undoubtedly most of the plants with available facilities will undertake subcontracts or prime contracts for component parts, Some machine tool makers, as has been reported in THE IRON AGE previously, have already undertaken supplementary work.

•

Orders at Optimistic Level

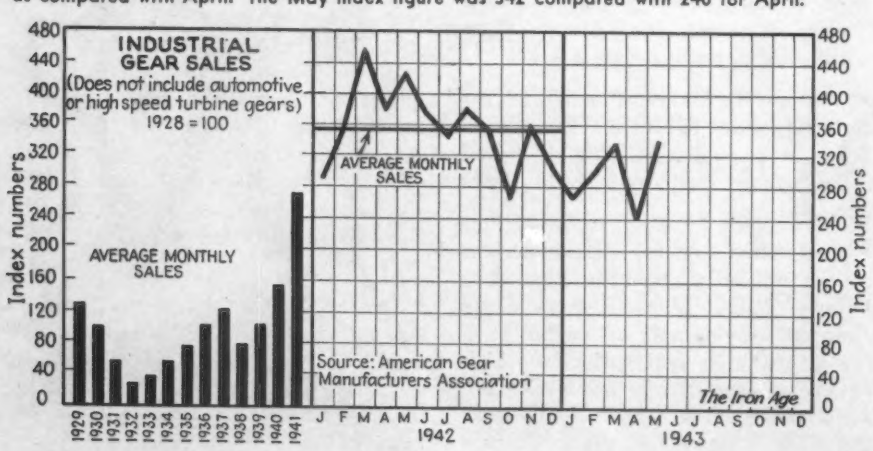
Cincinnati

• • • **The immediate headache** of the machine tool industry is the changeover of payroll systems to accommodate the pay-as-you-go tax deductions, but so far only minor irritations have been indicated.

Manufacturers indicate that new business, although in a diminished amount, is at a fairly optimistic level and the belief seems to be pretty prevalent that so long as the war lasts, with the constant changing of armament needs, new tools will continue to be in demand. As regards post-war markets, the general feeling is that a return to civilian production in the anticipated broad amount will require a tremendous amount of new tools.

Gear Sales Increased 42.5 Per Cent in May

. . . The gearing industry as represented by the members of the American Gear Manufacturers Association shows an increase of 42.5 per cent in the business booked in May, as compared with April. The May index figure was 342 compared with 240 for April.



Handle more jobs!

on your

G & L HORIZONTAL

with this attachment

Get Increased Flexibility and Multiple Operations on Occasional Turning, Boring and Facing Operations...

Short-run occasional jobs, whose size and shape make them unwieldy to handle on a chucking machine can be bored, faced and turned with this attachment. It is provided with two tool slides with six separate feeds, from .009" to .118" per revolution.

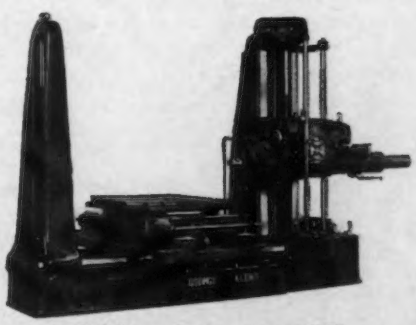
A simple lever controls the direction of feed to the tool slide and a micrometer adjustment for setting the tool slide to .001".

Removing or mounting the head takes but a few minutes and all adjustments are easily and quickly made.

Increases Flexibility Further When Used With Indexing Table...

Greater versatility can be added to your G & L when using an indexing table in conjunction with the continuous feed facing head. Jobs like large pipe fittings (tees and ells) are easily bored, faced and back faced on all surfaces with a standard machine equipped with rotary indexing table and continuous feed facing head as shown at right.

This attachment will add to the productivity of your equipment or help simplify jobs of the type shown at the right.

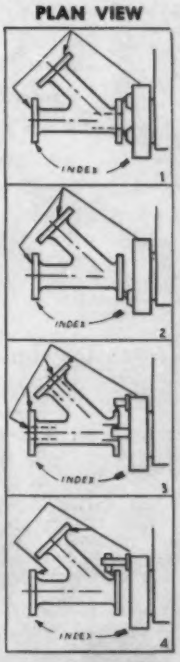


A Giddings & Lewis 340-RT machine with built-in power revolving table and a continuous feed facing and boring head mounted in position.

Speeds Up and Simplifies Operations Like These:

Jobs of this type, which are awkward or impossible to handle on chucking equipment, can be done in a hurry with the G & L continuous feed facing and boring head in conjunction with a G & L rotary indexing table. This fitting, for instance, can be completely machined in *one* setting.

PLAN VIEW



Operation 1
Rough face flange using two tool bits.
Index and perform same operation on other two faces.

Operation 2
Finish face flange using single point tool.
Index and perform same operation on other two faces.

Operation 3
Turn O.D. of flange and bore simultaneously.
Index and perform same operation on other two faces.

Operation 4
Back face flange using single point tool in telescopic tool holder.
Index and perform same operations on other two faces.
Unload.

Additional Data
is contained in this folder. When making inquiry please indicate your business connection and type and size of machine used. Ask for Bulletin No. 63.

GIDDINGS & LEWIS MACHINE TOOL CO.

136 DOTY ST., FOND DU LAC, WISCONSIN

NON-FERROUS METALS

. . . News and Market Activities

Aluminum Alloy Specifications Set

• • • The WPB has issued Directive No. P-I, setting forth the specifications for wrought alloy aluminum ingots covered in OPA Price Schedule, Maximum Price Regulation No. 2, which permits a maximum ceiling price of 4½c. a lb. for 17S, 18S, 32S and 52S ingot.

The analysis range of the alloys affected, in per cent, follows, two figures representing the minimum and maximum amounts of and one figure representing the maximum amount of such alloying ingredient permitted:

17S Alloy: Copper, 3.5 to 4.5; silicon, 0.65; iron, 0.75; magnesium, 0.2 to 0.8; manganese, 0.4 to 1; chrome, 0.2; zinc, 0.1; any one other, 0.05; total others, 0.15.

18S Alloy: Copper, 3.5 to 4.5; silicon, 0.9; iron, 0.75; magnesium, 0.4 to 0.9; manganese, 0.1; nickel, 1.7 to 2.3; titanium, 0.07; chrome, 0.1; zinc, 9.15; any one other, 0.05; total others, 0.15.

32S Alloy: Copper, 0.5 to 1.3; silicon, 11.00 to 13.5; iron, 0.75; magnesium, 0.8 to 1.3; manganese, 0.1; nickel, 0.5 to 1.3; chrome, 0.08; zinc, 0.15; any one other, 0.05; total others, 0.15.

52S Alloy: Copper, 0.1; silicon, 0.3; iron, 0.5; magnesium, 2.2 to 2.8; manganese, 0.1; chrome, 0.15 to 0.4; zinc, 0.1; any one other, 0.05; total others, 0.15.

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New York Suggested for New Aluminum Plant

• • • Following a survey for suitable sites for additional aluminum plants, the WPB has recommended New York as its first choice for the construction of reduction facilities of four or five pot lines, capable of producing 87,500 net tons of aluminum a year. A large DPC plant is already in operation there.

Other possible sites include Philadelphia where there is sufficient power and labor for three or four pot lines; the TVA power development area estimated to be able to handle four to six lines; the Bonneville Dam are for four to six lines, and southern California for three to four lines. However, the latter two sites do not have enough labor available for operating these plants.

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Allotment Numbers Changed For Aluminum Users

• • • Purchasers of aluminum products are required to show after July 1 as part of their CMP allotment number, the quarter in which they are authorized to place their CMP allotment instead of the digits representing the requested month of delivery. They also must show a requested month or date of delivery which shall be no earlier than they need the aluminum in accordance with their authorized production schedule.

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Service Charges for Magnesium Scrap

• • • Magnesium scrap buyers may pay dealers a service charge for picking up the scrap and loading it into railroad cars. The maximum price which the seller may charge, however, must be reduced by an amount reflecting the cost of loading the material for shipment.

Payment for dealers is provided in Amendment No. 1 to Maximum Price Regulation No. 302 which became effective July 1. This amendment makes two other changes in the regulation: (1) Remelt magnesium ingot containing 99 per cent or more pure magnesium is exempt from price control, and (2) an adjustable pricing provision is added, permitting a seller to agree to a selling price which can be increased up to a maximum price in effect at the time of delivery, in case OPA raises the maximum between the time the contract to sell is entered into and the actual delivery date. Contracts cannot be written providing for upward adjustment after delivery without specific authorization from OPA.

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Copper Powders Taken Off CMP

• • • Copper and copper base alloy powder has been removed from the Controlled Materials List for the third quarter, the WPB Copper Division announced June 29.

The action revokes that portion of CMPL-298, issued earlier this month, which stated that beginning July 1 no shipments of copper and copper base alloy powder could be made except on Controlled Materials orders.

Producers, under June 29 ruling, should continue to ship copper and copper base alloy powder on orders bearing preference ratings until Oct. 1.

It is stated that such powder will be placed on the Controlled Materials List for the fourth quarter beginning Oct. 1.

Producers should continue to file Form PD-59 for their raw material.

Dealers' Transactions in Non-Ferrous Scrap

Bureau of Mines

Receipts of non-ferrous scrap by dealers from farms, households, factories, utilities and other industrial sources of supply during the first four months of 1943, in tons:

1943	Copper	Lead-Tin	Aluminum	Zinc	Nickel	Magnesium	Total
January	37,489	24,481	10,770	3,358	339	187	76,624
February	40,483	21,927	10,395	3,791	353	202	77,151
March	44,712	22,882	12,061	3,692	467	228	84,042
April	44,172	11,133	22,352	3,913	421	262	82,253

Dealers' shipments to consumers, in tons:

1943	Copper	Lead-Tin	Aluminum	Zinc	Nickel	Magnesium	Total
January	42,073	25,832	10,353	3,464	419	167	82,308
February	41,425	25,024	11,112	4,141	396	197	82,295
March	46,056	24,239	11,597	3,817	459	223	86,391
April	43,556	22,187	11,882	4,310	370	238	82,543

Dealers' stocks at end of month, in tons:

1943	Copper	Lead-Tin	Aluminum	Zinc	Nickel	Magnesium	Total
January	50,231	35,982	9,137	6,206	831	95	102,482
February	49,289	32,885	8,420	5,856	788	100	97,388
March	47,945	31,528	8,884	5,731	796	105	94,989
April	48,561	31,693	8,135	5,334	847	129	94,699

This report was based on data tabulated from reports submitted each month by an identical control group of more than 1100 non-ferrous scrap metal dealers whose combined transactions cover more than three-fourths of the total for the entire non-ferrous scrap metal industry. Figures for each type of scrap were expanded by appropriate factors to include virtually all dealers in the United States. The number of non-ferrous scrap metal dealers in the United States is estimated to be approximately 4500, exclusive of peddlers and auto wreckers.

Refiner, Smelter Quotations

(Cents per lb.)

Copper, electrolytic, Conn. Valley	12.00
Copper, electrolytic, New York	11.75
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67
Lead, St. Louis	6.35
Lead, New York	6.50
Aluminum, virgin 99+%, delivered	15.00
Nickel, electrolytic, base refinery	35.00
Magnesium, 99.9+%, carlots	21.50
Magnesium, 12-in. sticks, carlots	30.00
Cadmium, delivered	90.00

ALUMINUM, No. 12 foundry grade (No. 2), 13.50c. per lb.; steel deoxidizing grades, 12.50c. to 13.75c. per lb. ANTIMONY, Asiatic, New York, nominal; American, 14.50c. a lb., f.o.b. Laredo, Tex., smelter. MERCURY, $191 to $193 per 76-lb. flask, f.o.b. shipping point or port of entry. BRASS INGOTS, commercial 85-5-5-5 (No. 115), 12.25c. a lb. COBALT, 97 to 99 per cent, $2.11 per lb. BERYLLIUM COPPER, 3.75 to 4.25 per cent Be., $15 per lb. contained Be. GOLD, U. S. Treasury, $35 an oz. INDIUM, 99.5 per cent, $10 per troy oz. IRIDIUM, $165 per troy oz. PALLADIUM, $24 per troy oz. PLATINUM, $35 per oz. SILVER, open market, New York, 44.75c. per oz. ARSENIC, prime, white, 99 per cent, 4c. per lb.

Copper, Copper Base Alloys

(Mill base prices)

Sheet: Copper, 20.87c.; high brass, 19.48c.; low brass, 80 per cent, 20.15c.; red brass, 85 per cent, 20.36c.; commercial bronze, 90 per cent, 21.07c., 95 per cent, 21.28c.; manganese bronze, 28.00c.; muntz metal, 22.75c.; naval brass, 24.50c.; phosphor bronze, grades A, B, 5 per cent, 36.25c.; Everdur, Herculoy, Olympic or equivalent, 26.00c.; nickel silver, 5 per cent, 26.50c.

Rods: Copper, hot rolled, 17.37c.; drawn, 18.37c.; free cutting brass, 15.01c.; low brass, 80 per cent, 20.40c.; red brass, 85 per cent, 20.61c.; commercial bronze, 90 per cent, 21.32c., 95 per cent, 21.53c.; Muntz metal, 18.87c.; naval brass, 19.12c.; phosphor bronze, grades A, B, 5 per cent, 36.50c.; Everdur, Herculoy, Olympic or equivalent, 25.50c.; nickel silver, 5 per cent, 28.75c.

Extruded Shapes: Copper, 20.87c.; architectural bronze, 19.12c.; manganese bronze, 24.00c.; Muntz metal, 20.12c.; naval brass, 20.37c.

ALUMINUM

Tubing: 2 in. O.D. x 0.065 in. wall; 2S, 40c. per lb. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c. per lb.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base price for tubing; 30,000-lb. base price for plate, flat stock. Variations from the above gage, size, temper, finish and quantity require extras.

Extruded Shapes: "As extruded" temper; 2000-lb. base price. 2S and 3S, factor No. 1 to 4, 25.5c. per lb.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by the weight per lineal foot. All prices above are subject to factor number range, temper, length, dimensional tolerances and quantity extras.

Wire, Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 34c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Variation from the above size, temper, finish and quantity require extras.

MAGNESIUM

Sheet, rod, tubes, bars and extruded shapes are subject to individual quotation. Magnesium Metal Turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c. a lb.

NON-FERROUS SCRAP METAL QUOTATIONS

Copper, Copper Base Alloy

(Current OPA maximum prices, cents per lb., f.o.b. point of shipment, plus premiums for quantities and special preparation.)

Group 1

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

Group 2

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

Group 3

Yellow brass soft sheet clippings	8.625
Yellow rod brass turnings	8.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	8.00
Old rolled brass	7.75
Admiralty condenser tubes	8.00
Muntz metal condenser tubes	7.50
Plated brass sheet, pipe reflectors	7.50
Manganese bronze solids	7.25[1] 6.25[2]
Manganese bronze borings	6.50[1] 5.50[2]

Group 4

Automobile radiators	7.00

Group 5

Refinery brass	5.00*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Aluminum

(Current OPA maximum prices, cents per lb., for less than 1000 lb. lots, f.o.b. point of shipment, plus premiums for quantities and special preparation.)

Plant scrap, segregated

2S solids	9.00
All other solids	8.50
Borings and turnings	
Wrought alloys (17S, 18S, 32S, 52S)	7.50
High grade alloys	7.00
Low grade alloys	6.50

Plant scrap, mixed

All solids	7.50
Borings and turnings	5.50

Obsolete scrap

Pure cable	9.00
Old sheet and utensils	7.50
Old castings and forgings	8.00
Pistons, free of struts	8.00
Pistons, with struts	6.00
Old alloy sheet	7.00

For lots of 1000 to 19,999 lb., add 1c. to above prices except for old castings and forgings, pistons free of struts, pistons with struts and old alloy sheet for which there is a premium of ½c. a lb. For lots over 19,999 lb. add 1½c. a lb. to prices listed.

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	8.00

Mixed, contaminated plant scrap

Grade 1 solids	11.00
Grade 1 borings and turnings	7.00
Grade 2 solids	9.00
Grade 2 borings and turnings	5.00

For lots over 1499 lb. add 1c. per lb.

Zinc

(Current OPA maximum prices, cents per lb., f.o.b., shipping point.)

New zinc clippings, trimmings	7.25
Engravers', lithographers' plates	7.25
Old zinc scrap	5.75
Unsweated zinc dross	5.80
Die cast slab	5.80
New die cast scrap	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

Lead

Soft and hard lead, including cable lead, f.o.b. point of shipment, deduct 0.55c. per lb. from basing point prices for refined metal.

Nickel

Nickel content 98 + per cent, copper under ½ per cent, 26c. per lb.; 90 to 98 per cent nickel, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25⅛
Electrolytic, full size, 22⅞c., cut to size	30⅛
Rolled, oval, straight, 15 in. and longer	23¼
Curved	24¼
Brass: Cast, 82-20, elliptical, 15 in. and longer	23⅝
Zinc: Cast, 99.99, 16 in. and over	16¼
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., for quantities, based on delivery from New York City)

Copper cyanide, tech., 100-lb. bbls.	34
Copper sulphate, 99.5 crystals, bbls. 1-5	5.65
Nickel salts, single, 425-lb. bbls.	13–13.5
Silver cyanide, 100 oz. lots	40.82–41⅛
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	33
Zinc sulphate, 89% crystals, bbls.	6.8

SCRAP

Government War-Scrap Yards Unlikely

New York

• • • **A few issues ago** THE IRON AGE **brought to light an unconfirmed rumor going the rounds concerning government establisment of a scrap yard in New England to process battlefield scrap in competition with New England dealers. This has been proved wholly untrue on good authority.**

The War Department plans to return considerable battlefield scrap. Because the time, the labor and the equipment for proper segregating are lacking abroad, this material will be loaded as is on ships and brought into Eastern ports. The necessity for a quick turn-around of these ships will compel such cargoes to be unloaded promptly and moved to what probably will be called salvage and reclamation centers.

As this material comes to these centers it will contain every possible kind of material from a battlefield. There will be enemy equipment which our government will want to examine; there may be live ammunition, which will have to be carefully removed and everything from shoes to what is patently scrap.

So the War Department at these salvage and reclamation centers contemplates putting its own labor at work doing the sorting. After this has been done, chemical warfare service, ordnance, transportation and other sections of the Army will inspect this material to determine what they want saved. The remainder will go to the scrap heap where it will be offered at public bidding to dealers.

This seems to bring the scrap dealer, both ferrous and nonferrous, into the picture at the earliest moment where he can render a genuine service. This plan is now being put into effect in several Atlantic cities and if it proves successful will be adopted generally. The action of the War Department in seeking out sites of these reclamation centers prompted the speculation.

Bees Breeze In; Scrap Stands Still

Buffalo

• • • **Swarming into the yard of the Buffalo Auto Wrecking Co., bees put a damper on the war effort. The buzzers were discovered by workmen as they prepared to get out several tons of scrap for immediate shipment. All work ceased pending the arrival of someone who knew about bees.**

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Paul Cabot Praises New AISI Scrap Plan

Washington

• • • **A ready market for collections** of iron and steel scrap which for geographic or other reasons have been difficult to move, will be assured by the plan recently released by the committee on scrap of the American Iron and Steel Institute, Paul C. Cabot, Director of the Salvage Division, War Production Board, said last week.

The plan provides machinery whereby every accumulation of prepared scrap, even in remote areas, will move promptly to consuming mills.

This will enable scrap inventories to be built up during the seasons in which scrap can be most readily collected. Such inventories, Mr. Cabot explained, constitute good "war armament insurance."

"I am gratified," Mr. Cabot said, "to see the steel industry take its position along with the War Production Board in this important matter of building larger national inventories of iron and steel scrap."

Price Appointed To Scrap Institute

Chicago

• • • **Arthur M. Price,** president of Price-Watson Co., Chicago, scrap metal brokers, has been appointed chairman of the finance committee of the Institute of Scrap Iron & Steel. Mr. Price has been a broker in Chicago since 1900, is a past-president of the Chicago chapter of the Institute and is a director at present.

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BUFFALO — The districts' three big consumers this week reported scrap stocks again in excellent condition as far as quantity is concerned. Shipments via barge canal from the New York City area have increased but lake loadings have not been up to expectations. Despite a continuing labor shortage, local yards have contributed considerably to rebuilding mill stocks which were whittled down somewhat by a late start in lake and barge navigation.

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CINCINNATI — Despite the continued statements on the part of dealers that a pinch of scrap is pending toward the end of the Summer and early Fall, consumers show no change in attitude toward purchasing. Foundries tend to resist further expansion of present inventories and the flow into this source has not been as active as heretofore. Mills, on the other hand, while taking proffered material, are scrutinizing shipments very carefully and insisting upon close adherence to specifications.

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PHILADELPHIA—Mills in this district are now taking everything they can get and are complaining that they can use larger shipments of No. 1 and No. 2 heavy melting grades and bundles. The scrap yards, however, are not getting these open hearth grades and hence cannot increase their shipments. Electric furnaces are still comfortable.

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NEW YORK—The mills are accepting all shipments and can handle more while one large Eastern mill is particularly anxious for as much scrap as it can get. Taking advantage of the dollar springboard, mills in Johnstown are accepting scrap from this district.

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CLEVELAND — Foundry scrap, which ordinarily at this time of year is coming in by boat in sufficient quantities to build up winter inventories, is now reported difficult to get except remotely even for current use. Some recent shipments have come from Bermuda, Texas and North Carolina. Last winter when summer-shipped stocks were also lacking, local material helped fill the gap, but this is now pretty well gone.

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BOSTON—The market, if possible, is quieter than a week ago so far as yards and brokers are concerned. Melters are fighting shy of cast steel blocks. Forwardings of shipyard scrap to New England mills hold up well. Not a few yards took a holiday over the Fourth Weekend.

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PITTSBURGH — Nickle turnings are tight. Blast furnace material is in demand. Other grades of scrap are going begging as consumers gaze on stockpiles which might take a severe beating soon.

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CHICAGO—Shipments of scrap to consumers here continue below the rate of consumption. WPB officials and mills are exerting considerable effort to step up shipments but without notable success thus far. Some new attention is being directed toward use of crushers in this area to process long turnings to provide wider use of this material.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES									
							Low Phos.		Heavy Structural and Plate			Foundry Steel				
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crankshafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$15.00	$15.00	$16.00	$17.00	$17.50	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	12.85	12.85	13.85	14.85	15.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.00	15.00	12.50	14.00	15.50

*Baled turnings are $5 per gross ton higher.

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles No. 3 bundles are $2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Minimum set at $14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakmont, Cal. Claymont, Del., includes the switching point of Chester, Pa. Chicago includes Gary, Ind., switching district.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

NEW LISTED GRADES: Priced in dollars per gross ton less than No. 1 heavy melting steel. **Pit scrap, ladle skulls, slag reclaim,** etc., of 85% or more Fe priced—$2; 75 to 85% Fe—$4; under 75% Fe—$8 per ton. Mill scale of 65% or more Fe—$8 per ton. **Mill cinder and grindings,** shipping point maximum price of $4 per gross ton at all U. S. shipping points.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B: switching district of Kansas City, Kan., Mo.

Tool Steel Scrap Ceiling Prices Set by MPR 379, May 4, 1943

BASE PRICE SEGREGATED

	Solids, Lb. Cont. W	Turnings, Lb. Cont. W
Type 1	$1.80	$1.60
Type 2	1.60	1.40
Type 3	1.25	1.25
Type 4*	0.125	0.105
Type 5*	0.135	0.115

*Per lb. of scrap material.

BASE PRICE UNSEGREGATED SOLIDS

$1.50 per lb. contained W if 5% or more.

$1.15 per lb. contained W if over 1% and less than 5%.

$0.80 per lb. contained Mo if 1½% or more.

BASE PRICE UNSEGREGATED TURNINGS

$1.30 per lb. contained W if 5% or more.

$1.00 per lb. contained W if 1% and less than 5%.

$0.70 per lb. contained Mo if 1½% or more.

Comparison of Prices . . .

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. [Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	July 6, 1943	June 29, 1943	June 8, 1943	July 7, 1942
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	July 6, 1943	June 29, 1943	June 8, 1943	July 7, 1942
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.89	$25.89
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.50	$6.50	$6.50	$6.00
Foundry coke, prompt	7.50	7.375	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 163 and 174.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
July 6, 1943	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.26190c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1943	2.25513c.,	2.25513c.,	$23.61	$23.61	$19.17	$19.17
1942	2.26190c.,	2.26190c.,	23.61	23.61	19.17	19.17
1941	2.43078c.,	2.43078c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 9
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	$5.00	$5.00	$5.00						$5.10					5.36¢	5.32¢
Electrolytic tin plate, box	$4.50		$4.50												
Black plate, 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[12]			3.37¢
Mfg. ternes, special box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢[13]	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢[13]	2.25¢		2.47¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					2.99¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton = 2.70¢)						2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
								(Coatesville and Claymont = 2.10¢)							
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.35¢		2.45¢	2.65¢	2.31¢	2.29¢	2.15¢
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright[15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.70¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

[1] Mill run sheets are 10c, per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 29,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [12] Boxed. [13] Portland and Seattle price, San Francisco price is 2.50c. [14] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILING—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points, Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at $49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at $34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at $34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at $50 at established basing points and slabs at $41; Empire Sheet and Tin Plate may sell slabs at $41 at established basing points and sheet bars at $39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge $41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge $36 per ton for small billets, f.o.b. Portsmouth and $37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	†† Hot Rolled, 2300	‡ Hot Rolled, 3100	†† Cold Drawn, 2300	‡ Cold Drawn, 3100
*Philadelphia	$3.518	$4.872[5]	$5.018	$3.922	$4.772	$3.605	$3.666	$3.822	$4.072	....	$7.116	....	....
*New York	3.590	4.613[2]	5.010	3.974[6]	4.774	3.768	3.758	3.853	4.103	6.008	7.158	7.303	8.453
*Boston	3.774	4.744	5.224	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.312	7.344	8.494
*Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052	....	....	....	....
*Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165	....	....	....	....
*Washington	3.596	4.841	5.196	4.041	4.741	3.796	3.930	3.941	4.041	....	....	....	....
*Chicago	3.25	4.20	5.234	3.60	4.655	3.55	3.55	3.50	3.75	5.75	6.90	6.85	8.00
*Milwaukee	3.38	4.332	5.274	3.73	4.788	3.68	3.68	3.68	3.88	5.88	7.03	6.98	8.13
*Cleveland	3.35	4.40	4.977	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.106	6.85	8.00
*Buffalo	3.35	4.40	4.754	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.90	6.85	8.00
*Detroit	3.45	4.50	5.004	3.70	5.9098	3.609	3.661	3.45	3.80	6.08	7.23	7.159	8.309
*Cincinnati	3.425	4.4752	4.8251	3.675	4.711	3.611	3.691	3.611	4.011	....	....	....	....
*St. Louis	3.397	4.2472	5.1724	3.747	4.9318	3.697	3.697	3.647	4.031	6.131	7.281	7.231	8.381
*Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	7.15	6.85	8.25
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Indianapolis	3.45	4.25	5.011	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	4.77	5.521	4.20	....	4.15	4.15	4.10	4.42	....	....	....	....
Birmingham	3.453	....	4.751	3.703	....	3.553	3.553	3.503	4.43	....	....	....	....
Memphis	3.85	4.66	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans	3.95	4.95	5.25	4.20	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston	3.75	5.43	5.25	4.30	....	5.25	5.25	3.75	4.50	....	....	....	....
†Los Angeles	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	5.70	9.55	8.55	10.55	9.55
†San Francisco	4.55	7.55	6.60	4.50	....	4.65	4.35	3.95	5.55	9.80	8.80	10.80	9.80
†Seattle	4.657	6.63	5.707	4.25	....	4.75	4.45	4.20	5.75	....	8.00	....	....

N. E. STEELS

(Hot Rolled Mill Extras for Alloy Content)

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35				.10c	$2.00		
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 8020	.18/ .23	1.00/1.30	.040	.040	.20/ .35			.10/ .20	.45	9.00	.95c	$19.00
NE 8442*	.40/ .45	1.30/1.60	.040	.040	.20/ .35			.30/ .40	.90	18.00	1.40	28.00
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.20/ .30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20				.40c	8.00		
NE 9260	.55/ .65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9262	.55/ .65	.75/1.00	.040	.040	1.80/2.20	.20/ .40			.65	13.00		
NE 9415	.13/ .18	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30c	$26.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9440	.38/ .43	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9630	.28/ .33	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9635	.33/ .38	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9637	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9640	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9642	.40/ .45	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9645	.43/ .48	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9650	.48/ .53	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over: Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. [8] 2000 to 39,999 lb. At Philadelphia galvanized sheets, 2500 more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb.; galvanized and cold rolled sheets, 750 to 4999 lb.; cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lbs.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

†† For zoned cities these grades have been revised to NE 8617-20.

‡ For zoned cities these grades have been revised to NE 9442-45 Ann'ld.

* Base delivered prices according to price zones established by Amendments to RPS 49 including the 3% transportation tax—not including the 6% freight increase of March 18, 1942, rescinded May 15, 1943.

***Recommended for large sections only. Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and $54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, $5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.**

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; f.o.b. Duluth, billets only, $2 higher. Delivered prices do not reflect new per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00
Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	$54.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham. Prices delivered Detroit are $2.00 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 202
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

The main job today is maintenance

...even with sturdy FORD Triblocs

This is no time to abuse machinery. Because steel is so critical to America now, it is up to every one of us to make our present equipment last longer. That means proper maintenance. Here are a few simple things to do to keep your **FORD TRIBLOCS** in efficient working order:

- Keep equipment well lubricated and in good repair.
- Don't exceed rated capacity.
- Inspect chain periodically and lubricate to avoid excessive wear.
- Don't make lifts or pulls for which hoist was not designed or intended.
- Avoid dropping hoists or throwing chain about carelessly.
- Replace hooks when showing signs of distortion from overloading.
- Be sure the hoist has the capacity and characteristics necessary for the job.
- Proper hoist selection saves production time and lengthens hoist life.

Write for information on **FORD TRIBLOCS.** They range in capacities from ¼ ton to 40 tons. They are available to all who have adequate priority rating.

ACCO

FORD CHAIN BLOCK DIVISION

PHILADELPHIA • CHICAGO • DENVER • LOS ANGELES • SAN FRANCISCO • PORTLAND

In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT · CONNECTICUT

Long in popular demand in metal working plants, the sale of Monarch lathes has received a tremendous impetus during recent years.

Repeated enlargements of plant have been necessary and upon completion of each new building additional Euclid Cranes have been installed.

Today ten 10-ton Euclids are operating "around the clock"—moving heavy lathe beds—stepping up assembly—speeding finished lathes toward the shipping platform and production fronts throughout the world.

Euclid Cranes and Hoists are privileged to be partners in production with leaders in all principle lines of manufacture—in normal times and now in increased measure during the war program.

Continued acceptance by leaders of industry — men who know and build machinery of the highest calibre—gives assurance that Euclid Cranes and Hoists serve with the utmost efficiency and satisfaction.

THE EUCLID CRANE & HOIST CO.
1361 CHARDON RD., EUCLID, O.

PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller		64
½ in. and smaller	62	
½ in. through 1 in.		60
9/16 to 1 in.	59	
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	60

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets *(½ in. and larger)*

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets *(7/16 in. and smaller)*

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws

	Per Cent Off List
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	38
Filister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

PRICES

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)	*Per Lb.*
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	*Galv.*
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	25	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	*Galv.*
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

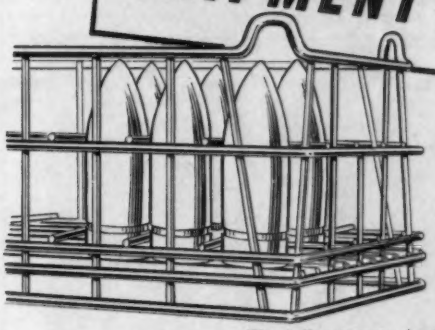
Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

Available for SHIPMENT FROM STOCK



20-37-40 mm.
MUNITIONS
HANDLING BASKETS

The following stock sizes of shot handling baskets can be shipped from stock:

GV-1—37-40 mm. 50-pocket
19⅞ x 10⅜ x 6" high overall. 4⅞" deep inside. Pocket clearance 1¾". Top divider 2¼" above bottom. Lower divider ½" above bottom.

GV-2—37 mm. only. 40-pocket
14⅜ x 9-7/32 x 6⅛" high overall. 5¼" deep inside. Pocket clearance 1-17/32". Top divider 2⅛" above bottom. Bottom divider ½" above bottom.

GV-20—20 mm. 150-pocket
15-15/16 x 10⅞ x 5⅛" high overall. 4¼" deep inside. Pocket clearance ⅞". Top divider 1¾" above bottom. Bottom divider 5/16" above bottom.

WE HAVE FACILITIES FOR MAKING WIRE PARTS AND PRODUCTS OF ALL TYPES (Except Springs)
Shapes
Shelving
Racks
Cases
Guards
Trays
Carriers
Floor Grating
Etc., Etc.

We can make any type of basket for handling shot, caps, shells, cases, fuses, bombs. Heat treating baskets of all types a specialty. If a standard basket fills the bill—well and good. If not, our engineers will design the right basket for your requirements.

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UNION STEEL PRODUCTS COMPANY
442 Pine Street · Albion, Michigan

A.I.S.I. HY-TEN S.A.E. N.E.

ALLOY STEELS FOR OFFENSE

Scientifically selected to conserve critical alloys and meet the requirements of the AIRCRAFT, ORDNANCE, and MACHINE TOOL industries.

Complete "EARMARKED" stocks of Aircraft alloy steels at Buffalo and Detroit.

WHEELOCK, LOVEJOY & CO., INC.
126 Sidney Street **Cambridge, Mass.**
Cleveland, Chicago, Newark, Detroit, Buffalo, Cincinnati

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	*$25.00*	*$24.50*	*$26.00*	*$26.50*	.....	.....
Brooklyn	*27.50*	.....	.....	*28.00*	.....	.....
Jersey City	*26.53*	*26.03*	*27.53*	*27.03*	.....	.....
Philadelphia	*25.84*	*25.34*	*26.84*	*26.34*	*$30.74*	.....
Bethlehem, Pa.	25.00	24.50	26.00	25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati, Ohio	*23.94*	*23.94*	.....	*25.11*	.....	.....
Canton, Ohio	*25.39*	*24.89*	*25.89*	*25.39*	*32.69*	.....
Mansfield, Ohio	*25.94*	*25.44*	*26.44*	*25.94*	*32.86*	.....
St. Louis	*24.50*	*24.50*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	*35.46*	.....*$31.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	*22.42*	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	*22.42*	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	*39.80*	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*26.95*	.....	.....	.....	.....	.....
San Francisco	*26.95*	.....	.....	.....	.....	.....
Seattle	*26.95*	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge $30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

Marvel No. 8 *Metal-Cutting* Band Saw

Write for Bulletin C-42

Doing its War Job Well!

The busiest tool in the tool rooms, an essential tool in the complete die shop and a time and money saver in the maintenance department, because "it does all things well." The MARVEL No. 8 Metal Cutting Band Saw (capacity 18" x 18") will snip off an ⅛" drill rod, rough out the largest billet or cut a perfect 45° mortice on the end of a large I-beam without any special setting-up. Its large planer type bed takes all work. Its continuous blade feeds into the work at any angle from 45° right to 45° left. It has a large removable vise and a combination hand and/or power feed.

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Ave., Chicago, U.S.A.
Eastern Sales Office: 225 Lafayette St., New York

MARVEL SAWS

Metal Powders

Prices are based on current market prices of ingots plus a fixed figure. For ton lots f.o.b. shipping point, in cents per lb.

Copper, electrolytic, 150 and 200 mesh	21⅛ to 23⅛c.
Copper, reduced, 150 and 200 mesh	20½ to 25¼c.
Iron, commercial, 100 and 200 mesh	13½ to 15c.
Iron, crushed, 200 mesh and finer	4c.
Iron, hydrogen reduced, 300 mesh and finer	62c.
Iron, electrolytic, unannealed, coarser than 300 mesh	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh	42c.
Iron, carbonyl, 300 mesh and finer	90c.
Aluminum, 100 and 200 mesh.	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	$1
Chromium, 150 mesh	$1.03
Lead, 100, 200 & 300 mesh,	11½ to 12½c.
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh,	8½c. plus metal
Tin, 100 mesh	58¾c.

*Freight allowed east of Mississippi.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless Cold Drawn	Hot Rolled	Lap Weld Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft., and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

PRICES

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorous, 51.50	4.35

*Adjustments are made to indicated prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

COKE

	Per Net Ton
Furnace	
†Connellsville, prompt	$6.50*
Foundry	
†Connellsville, prompt	$7.50
Fayette County, W. Va. (Beehive)	$8.10
By-product, Chicago	$12.25
By-product, New England	$13.75
By-product, Newark	$12.40 to $12.95
By-product, Philadelphia	$12.38
By-product, Cleveland	$12.30
By-product, Cincinnati	$11.75
By-product, Birmingham	$8.50†
By-product, St. Louis	$12.02
By-product, Buffalo	$12.50

Maximum by-product coke prices established by OPA became effective Oct. 1, 1941.

*Hand-drawn ovens using trucked coal are permitted to charge $7.00 per net ton, plus usual transportation. Maximum beehive furnace coke prices established by OPA, Feb. 8, 1942. †F.o.b. oven.

FLUORSPAR

	Per Net Ton
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$25.00
Domestic, f.o.b. Ohio River landing barges	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25.00

REFRACTORIES

(*F.o.b. Works*)

Fire Clay Brick	*Per 1000*
Super-duty brick, St. Louis	$64.60
First quality, Pa., Md., Ky., Mo., Ill.	51.30
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick	
Pennsylvania & Birmingham	$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00

Chrome Brick	*Per Net Ton*
Standard, chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

INDUSTRIAL
ORNAMENTAL

ANY METAL ANY PERFORATION

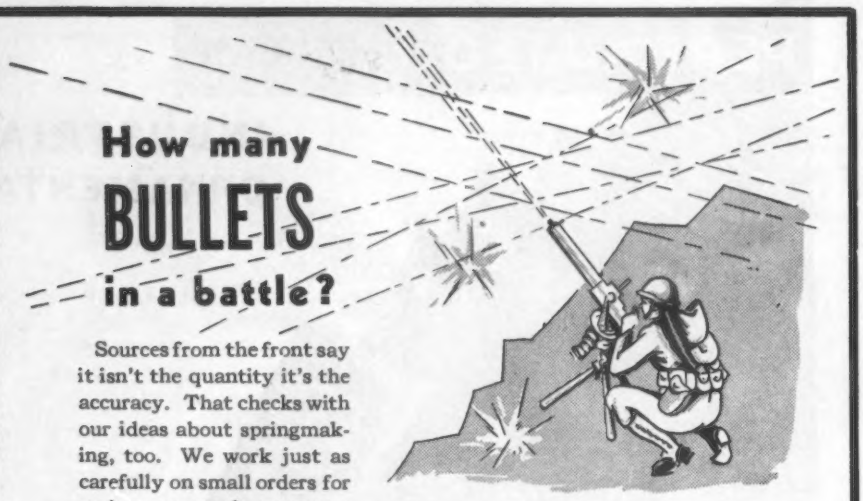
The Harrington & King PERFORATING Co.

5657 FILLMORE STREET—CHICAGO 44, ILL.
New York 6, Office, 114 Liberty Street

JOHNSON XLO *Music Wire*

MUSIC WIRE
(XLO Brand)
Wire of a thousand uses.
(WD 1085-WD 1095)
Wire sizes
.005" to .200" dia.

JOHNSON STEEL & WIRE CO., INC.
WORCESTER ★ MASSACHUSETTS
NEW YORK — ATLANTA — AKRON — CHICAGO — LOS ANGELES



How many BULLETS in a battle?

Sources from the front say it isn't the quantity it's the accuracy. That checks with our ideas about springmaking, too. We work just as carefully on small orders for springs as we do on mass-production lots. There are many springs that may seem to suit your requirement — there's only **one** that meets all conditions of efficient manufacture and performance. Dunbar experience helps to select that spring — and to produce it efficiently and economically.

There's plenty of fight in springs made by

DUNBAR SPRINGMAKERS

SPRINGS WIRE FORMS SMALL STAMPINGS

DUNBAR BROS. CO., Bristol, Conn.

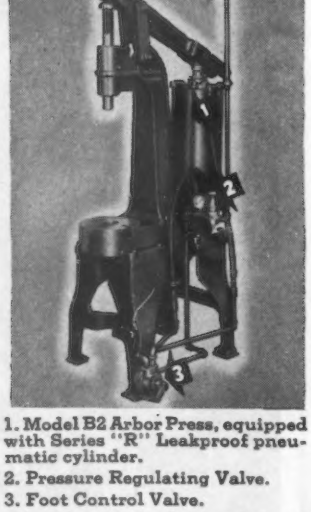
Division of Associated Spring Corporation

This simple set-up gives you

Better Performance
ON MANY PRESS OPERATIONS

★ Hannifin Pneumatic Arbor Presses are being used for fast, efficient production of a great variety of press-assembly, molding, straightening, bending, forming, and similar operations involving the application of pressure. An air operated press provides uniform, adjustable pressure by means of the regulating valve, and simple, foot-pedal control. Operator fatigue is avoided, and fast, uniform production can be consistently maintained.

Write for Bulletin 46-A describing the complete range of types and sizes of Hannifin Arbor Presses.



1. Model B2 Arbor Press, equipped with Series "R" Leakproof pneumatic cylinder.
2. Pressure Regulating Valve.
3. Foot Control Valve.

A hand control valve can be used if desired.

HANNIFIN MANUFACTURING COMPANY

621-631 South Kolmar Avenue — Chicago 24, Illinois

Ferromanganese

F.o.b New York, Philadelphia, Baltimore, Mobile or New Orleans, duty paid, 80%, per gross ton (carloads) $135.00
Delivered Pittsburgh $140.23
F.o.b. Southern furnaces $135.00

For packed carloads, add $6 per gross ton; $10 for ton; $13.50 for less than a ton; $18 for less than 200 lb.

Electrolytic Manganese

99.9¼+%, less ton lots, per lb..... 42c.
Ton lots..... 40c.
Annual contracts..... 38c.

Spiegeleisen

(Carlots, per gross ton, Palmerton, Pa.)
Domestic, 19 to 21% $36.00
Domestic, 26 to 29% 49.50

Electric Ferrosilicon

OPA maximum base price cents per lb Si contained, lump size, f.o.b. shipping point with freight allowed to destination. Roman type indicates bulk car lots, *italics* l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
50% silicon	6.65c.	7.10c.	7.25c.
	7.85c.	*9.70c.*	*8.75c.*
75% silicon	8.05c.	8.20c.	8.75c.
	9.05c.	*9.65c.*	*13.10c*

Spot sales 45c. per lb. higher for 50% Si; 30c. for 75% Si. For extras and premiums see MPR 405.

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)
F.o.b. Jackson, Ohio $29.50*
Buffalo 30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(65-72% Cr; 2% max. Si; lump)

OPA maximum base contract prices per lb. of contained Cr, f.o.b. shipping point, with freight allowed to destination.

Roman type are carload prices in bulk: *italics* are l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
0.03% carbon ..	25.00c.	25.40c.	26.00c.
	26.00c.	*26.65c.*	*27.85c.*
0.06% carbon ..	23.00c.	23.40c.	24.00c.
	24.00c.	*24.65c.*	*25.85c.*
0.10% carbon	22.50c.	22.90c.	23.50c.
	23.50c.	*24.15c.*	*25.35c.*
1.00% carbon ..	20.50c.	20.90c.	21.50c.
	21.50c.	*22.15c.*	*23.35c.*
2.00% carbon ..	19.50c.	19.90c.	20.50c.
	20.50c.	*21.15c.*	*22.35c.*

Spot prices are ¼c. higher per lb. contained Cr. For extras and premiums see MPR 407.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	*13.10c.*	*13.55c.*	*16.50c.*
97% Si, 1% Fe.	*13.45c.*	*13.90c.*	*16.80c.*

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% silicon.

	Eastern Zone	Central Zone	Western Zone
Car Lots ...	3.35c	3.50c.	3.65c.

Spot prices ¼c. higher per lb. of briquet. For premiums and extras see MPR 405.

Silicomanganese

(Per gross ton, delivered, carloads, bulk)
3.00 carbon $120.00*
2.50 carbon 125.00*
2.00 carbon 130.00*
1.00 carbon 140.00*
Briquets, contract, basis carlots, bulk freight allowed, per lb.. 5.80c.†
Packed ..... 6.05c.†
Less-ton lots ..... 6.55c.†

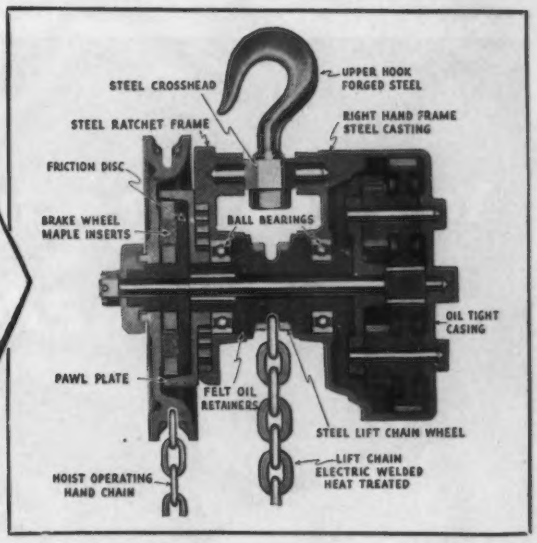
*Spot prices are $5 per ton higher.
†Spot prices ¼c. higher.

PRICES

Other Ferroalloys

Ferrotungsten, delivered, carlots, per lb. contained tungsten	$1.90
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Ferrovanadium, 35%-40%, contract basis, f.o.b. producers plant, usual freight allowances, open-hearth grade, per lb. contained vanadium	$2.70
Special grade	$2.80
Very special grade	$2.90
Vanadium pentoxide, 88%-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5	$1.10
Ferroboron, contract basis, 17.50 % boron minimum, f.o.b. Niagara Falls, carlots, per lb. alloy	$1.20
Ton lots	$1.25
Silcaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	23c.
Silvaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	40c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 100 lb. and over, maximum based on rate to St. Louis, per lb.	45c.
Bortam, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Borosil, 3% to 4% boron, 40 to 45% silicon, f.o.b. Philo, Ohio, per pound contained boron	$7.00
Ferrocolumbium, 50% to 60%, f.o.b. Niagara Falls, ton lots, per lb. contained columbium	$2.25
Less-ton lots	$2.30
Ferrotitanium, 40%-45%, f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained titanium	$1.23
Less-ton lots	$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	$1.35
Less-ton lots	$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore & St. Louis, per gross ton.	$142.50
3%-5% carbon	$157.50
Ferrophosphorus, 18% electric or blast furnace, f.o.b. Anniston, Ala. carlots, with $3 unitage freight equaled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75 per cent, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	95c.
Calcium molybdate, 40%-45%, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo	80c.
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb.	$3.00
Zirconium, 35-40%, contract basis, carloads in bulk or package, per lb. of alloy	15c.
Less-ton lots	16c.
Zirconium, 12-15%, contract basis, carlots, bulk, per gross ton.	$102.50
Packed	$107.50
Less-ton lots	$112.50
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, per lb.	7.50c.
Ton lots	8c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, carlots, freight allowed, per lb.	10.50c.
Less-ton lots	11c.

WHY THIS *Chain Hoist* STAYS ON THE JOB



● Cutaway view of a Reading Multiple Gear Chain Hoist. Capacities from ½ to 20 tons.

All gears in the Reading Multiple Gear Chain Hoist operate in a bath of oil. And note the compact construction! Maintenance can be handled by an ordinary mechanic.

● Ask for your free copy of Reading Catalog No. 58 which describes all types of Reading Chain Hoists. It can be of real help in selecting chain hoists *engineered to stay on the job with minimum maintenance.*

READING CHAIN HOISTS

Multiple Gear Hoists — ½ to 20 tons; Army-Navy Type Hoists — ½ to 10 tons; Differential Type Hoists — ½ and 1 ton; Extended Chain Wheel Hoists — ½ to 5 tons; Low-Head Hoists — 2 to 12 tons; Quick-Speed Multiple Gear Hoists — up to 1 ton; Twin Hook Type Hoists — ½ to 5 tons; Worm Geared Hoists — ½ and 1 ton.

Reading Chain & Block Corporation, 2101 Adams St., Reading, Pa.

READING CHAIN HOISTS · ELECTRIC HOISTS OVERHEAD TRAVELING CRANES

"HERCULES" REG. U.S. PAT. OFF. RED-STRAND WIRE ROPE

You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • *Results are what count, and the performance record of this wire rope continues to make and hold friends.*

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS
5909 KENNERLY AVENUE — ESTABLISHED 1857 — ST. LOUIS, MISSOURI, U.S.A.

NEW YORK • • • 90 West Street
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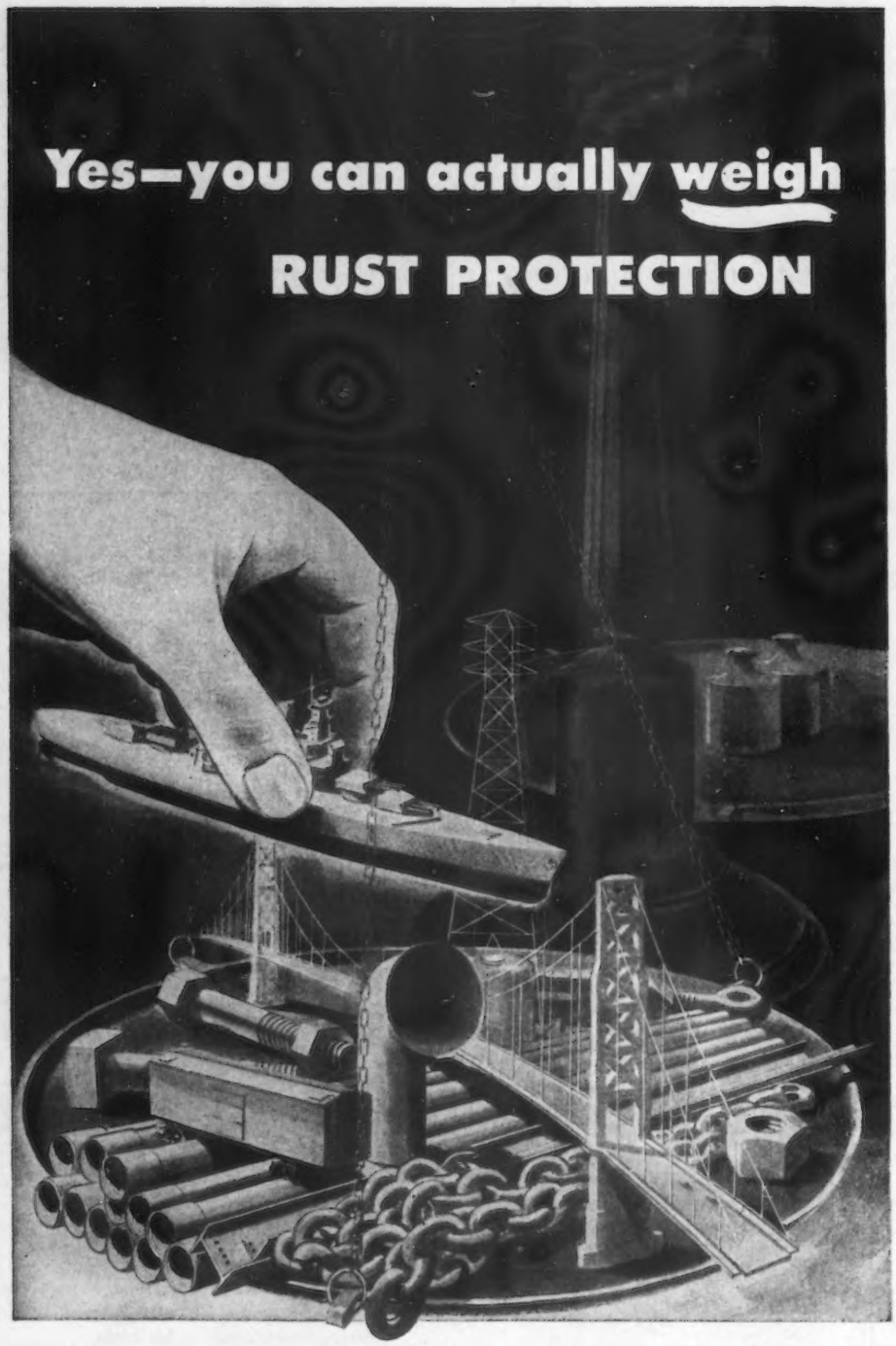
DENVER • • • 1554 Wazee Street
SAN FRANCISCO • • 520 Fourth Street
PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South



"If it carries this seal it's a job well done."

Buy from the qualified members listed below and KNOW you are getting a genuine HOT-DIP job.

CALIFORNIA
LOS ANGELES GALVANIZING CO., HUNTINGTON PARK
EMSCO DERRICK & EQUIPMENT CO., LOS ANGELES
JOSLYN CO. OF CALIFORNIA, LOS ANGELES
WESTERN GALVANIZING COMPANY, LOS ANGELES
HUBBARD & CO., OAKLAND
JOHN FINN METAL WORKS, SAN FRANCISCO
SAN FRANCISCO GALVANIZING WORKS, SAN FRANCISCO

CONNECTICUT
WILCOX, CRITTENDEN & COMPANY, INC., MIDDLETOWN

GEORGIA
ATLANTIC STEEL CO., ATLANTA

ILLINOIS
EQUIPMENT STEEL PRODUCTS DIVISION OF UNION ASBESTOS AND RUBBER CO., BLUE ISLAND
JOSLYN MFG. & SUPPLY CO., CHICAGO
STANDARD GALVANIZING CO., CHICAGO

MAINE
THE THOMAS LAUGHLIN CO., PORTLAND

MARYLAND
SOUTHERN GALVANIZING COMPANY, BALTIMORE

MICHIGAN
RIVERSIDE FOUNDRY & GALVANIZING CO., KALAMAZOO

MINNESOTA
LEWIS BOLT & NUT CO., MINNEAPOLIS

MISSOURI
COLUMBIAN STEEL TANK CO., KANSAS CITY
MISSOURI ROLLING MILL CORP., ST. LOUIS

NEW JERSEY
DIAMOND EXPANSION BOLT CO., INC., GARWOOD
L. O. KOVEN & BROTHER, INC., JERSEY CITY
INDEPENDENT GALVANIZING COMPANY, NEWARK

NEW YORK
ACME STEEL & MALLEABLE IRON WORKS, BUFFALO
BUFFALO GALVANIZING & TINNING WORKS, INC., BUFFALO
THOMAS GREGORY GALVANIZING WORKS, MASPETH, (N. Y. C.)
ATLANTIC STAMPING CO., ROCHESTER

OHIO
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